

LabMaster-aw

& LabPartner-aw

Operating Instructions



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1. Introduction

1.1. Starting Out

Thank you for having purchased an instrument of the **Novasina LabMASTER-aw** system for measuring **water activity**. You have opted for a highly accurate and reliable instrument representing the latest state of the art in electronics and software design when it comes to highest precision in a_w (water activity) measuring.

To get the most out of all the possibilities of your Novasina **LabMASTER-aw** or **LabPARTNER-aw**, and to guarantee safe, reliable operation, please read these operating instructions before setting the unit into operation carefully.

Please keep this manual in a safe place where it will be at hand whenever you need it. If you lose the manual, please contact your Novasina representative for immediate replacement.

1.2. Important Notes

Intended use

The Novasina **LabMASTER-aw** or **LabPARTNER-aw** is exclusively intended for measuring **WATER ACTIVITY** under strict adherence to the information and notes given in this manual. Any use beyond this scope is considered to be a violation of the intended purpose and may endanger your safety or could result in the product being damaged. Any use of this Novasina instrument other than as intended is at the customer's own risk and by no means will the manufacturer or supplier be liable for any resulting damage.



Safety instructions

- The Novasina **LabMASTER-aw** system should be serviced, maintained and repaired only by qualified people who are familiar with the equipment.
- The **LabMASTER-aw** system must not be used in hazardous zones or similar areas. The design was made only for the laboratory field.
- No explosive materials and no highly inflammable substances may be measured in the measurement chamber system.
- Before connecting the unit to the mains, ensure that:
 - the mains voltage is within 90...260V, at 50 or 60Hz. Please check the name plate of the system!
 - the power cable between the mains and the instrument is not damaged.
- The Novasina **LabMASTER-aw** system may be used only under the specified operating conditions (see chapter „Specifications“).
- Observe and strictly adhere to the local regulations regarding the handling of mains- powered devices.
- Use only genuine accessories and spare parts available from your Novasina supplier or look in the internet under www.novasina.com.
- This instrument must not be modified in any way without the written consent of Novasina, a division of Axair Ltd.
- Never open the instrument without removing the mains power cable first to avoid any risk of dangerous currents.

2. General Product Description

2.1. System Overview

The **LabMASTER-aw** system has been specially developed for determining the fraction of **free water** in a test sample like food, cosmetics or pharmaceutical probes. This fraction is also known as "**water activity**" in the foodstuffs industry. Unfortunately, these days many people still confuse **water activity** with the water content of a sample. Measuring the water content of a specimen, however, is measuring the combined fraction of both bound and free water. The water content can be determined indirectly, yet non - destructively, using **LabMASTER-aw** (see SI Sorption Isotherm)

The fundamental requisite for determining water activity quickly and with extreme precision is an excellent moisture sensor that reaches an exact, reproducible measurement over a very wide range (*moisture from 0.... 100% rF*). Novasina has been developing special electrolytic moisture sensors that stand out for such unique properties for more than 40 years. The intelligent, resistive, electrolytic sensor integrated into the **LabMASTER** or **PARTNER-aw** is based on the latest Novasina „Novalyte Technology“, with which one can guarantee such precision and reproducibility. Thanks this technology an aw-meter as has never been attained before.

The complete **LabMASTER-aw** system comprises various modular components. The system can thus be optimally adapted to the customer and his requirements.

The components of such a system are essentially as follows:



LabMaster-aw

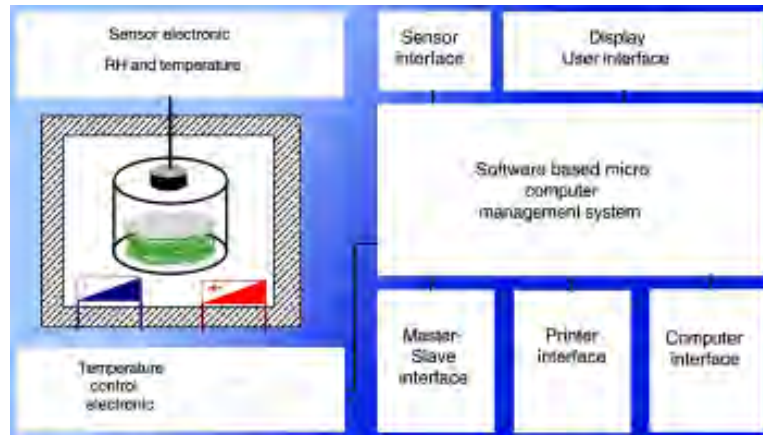


LabPartner-aw 1 ... 9



PC- analysis software for **LabMaster/Partner-aw**

2.2. System Architecture



A **LabMASTER-aw** can be operated either alone or as controlling unit in a network. The connection between this main unit and up to nine **LabPARTNER-aw** network components is established over a special communication circuit. The **LabMASTER-aw** is normally powered from a mains socket. To avoid high inrush currents, the connected **LabPARTNER-aw** units are fed power directly from the **LabMASTER-aw**.

The **LabMASTER-aw** can communicate with other computer systems, such as a (Windows) PC or laptop, over a USB or RS-232 interface. The appropriate software for analysis and data recording comes included with the „STANDARD“ and „ADVANCED“ models.

A **LabMASTER-aw** can monitor and control up to nine additional **LabPARTNER-aw** units. All settings to the **LabPARTNER-aw** are made from the **LabMASTER-aw**, the controlling unit. A **LabPARTNER-aw** can not be operated alone (without **LabMaster-aw**)!

Every **LabPARTNER-aw** has its own independent, temperature - stabilised measuring chamber, a chamber for preconditioning, an LCD panel and two buttons (for start / stop and internal settings options). A device number can be allocated using the software setup to uniquely identify the unit. Attention! No two units may be allocated the same number in a network!!

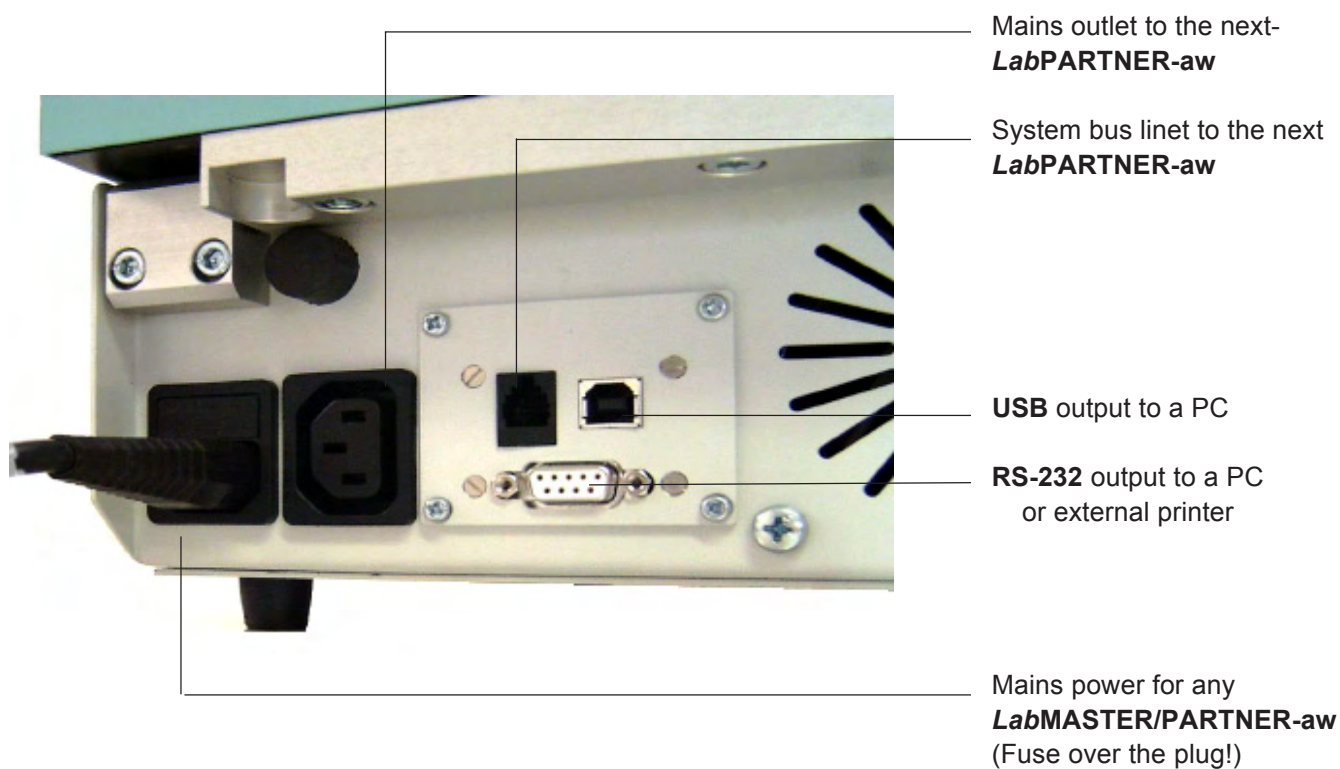
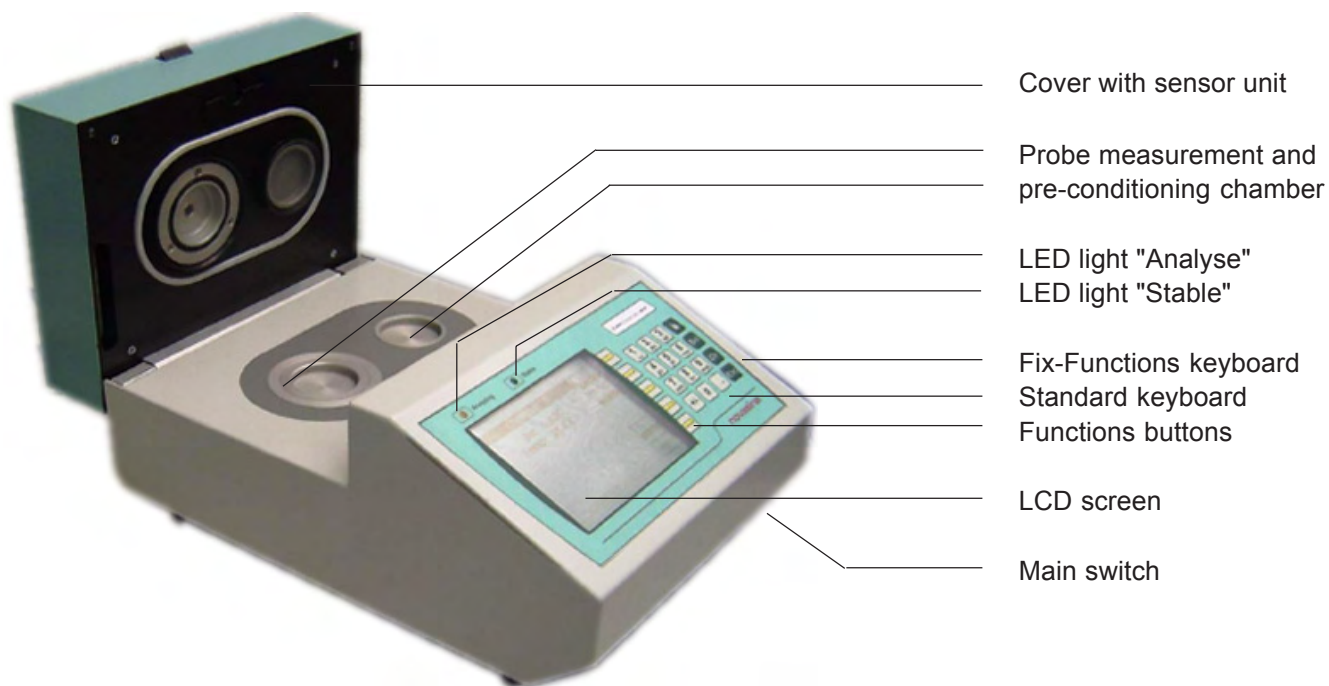
Please check that on a system of **LabMASTER / PARTNER-aw** it has to be only one **LabMASTER** as a chief manager. It is forbidden to connect two **LabMASTER-aw** via the bus line together.

For further information, please read the operating instructions for the **LabPARTNER-aw**.



A **LabMaster-aw** system with 3 **Partner** and a laptop

2.3. Instrument Overview



! Detailed **LabPartner-aw** description see operation manual !

2.4. Standard Delivery



Novasina **LabMASTER-aw „BASIC“**:

AW measuring instrument with precise, temperature - stabilised sample chamber and additional preconditioning chamber, basis software without user administration/management and without samples database system.

This instrument can only be operated as a stand-alone system. No analysis programs for PC (Novalog MC) and no cable are included. An connection to an external RS-232 printer is possible. It is as well possible to expand the instrument to a higher software level with additional functions at any time by a version code.

Standard accessories:

- Set with 5 humidity standards: SAL-T 11, 33, 75, 90, 97%
- 50 sample cups
- Operating instructions

Novasina **LabMASTER-aw „STANDARD“**: (single-channel control)

AW measuring instrument with precise, temperature-stabilised sample chamber and additional preconditioning chamber, standard software with user administration/management and samples database functions.

This instrument can only be operated as a stand-alone system. It can communicate with a PC-based computer system (required PC-based software included) over a USB/RS232 interface. An connection to an external RS-232 printer is possible. It is as well possible to expand the instrument to a higher software level with additional functions at any time.

Standard accessories:

- Set with 5 humidity standards: SAL-T 11, 33, 75, 90, 97%
- 50 sample cups
- Operating instructions
- Interface RS232 - PC cable 1.8m/D-Sub 9M/9F and USB cable
- PC software „NOVALOG MC“ for Win9X/2000/NT/XP

Novasina **LabMASTER-aw „ADVANCED“** (multi-channel control)

AW measuring instrument with precise, temperature-stabilised sample chamber and additional preconditioning chamber, standard software with multi-user administration/management and samples database system. System extension via bus line to a **LabPARTNER-aw** possible.

The software for this instrument allows a multi-unit measurement system with up to 9 **LabPARTNER** units. But can also be operated as a stand-alone unit. The instrument communicates with a PC-based computer system over a USB / RS232 interface and with the **LabPARTNER** units with a Field Bus system (required software is included).An connection to an external RS-232 printer is possible.

Standard accessories:

- Set with 5 humidity standards: SAL-T 11, 33, 75, 90, 97%
- 50 sample cups
- Operating instructions
- Interface RS232 - PC cable 1.8m/D-Sub 9M/9F and USB cable
- PC software „NovaLog MC“ for Win9X/2000/NT/XP



Novasina **LabPartner-aw** (max. 1....9 units on a network):

Modular expansion of the measuring station by one or more measuring and preconditioning chambers can be achieved over an internal network using **LabPARTNER-aw** units.

Standard accessories:

- 50 sample cups
- Power and communication cables, both 1.8m, from **MASTER** to **PARTNER** unit.

Please read the **LabPARTNER-aw** operating instructions for further details!

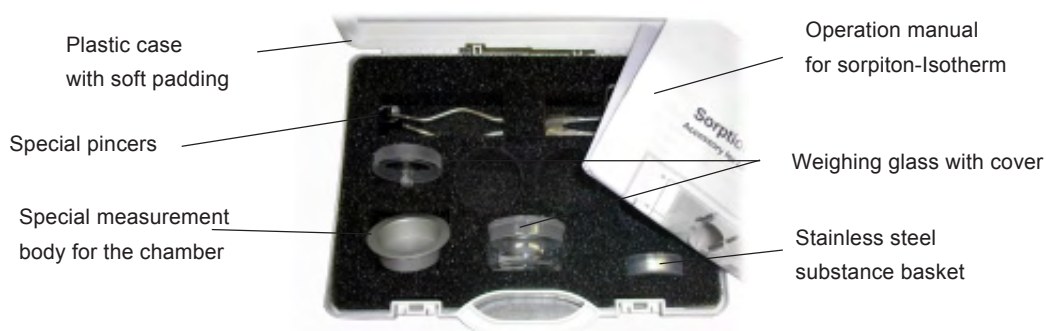
2.5. Optional Accessories



For certain use of the equipment, the precision measuring cell of the **LabMASTER/PARTNER-aw** must be protected against aggressive vapours. Novasina offers various protective filter systems for this purpose. Please consult the corresponding datasheets for Novasina protective filter systems or contact your Novasina sales partner. Using filter systems can prolong the service life of the measuring cell considerably. Should you implement such filter systems, please see to it that they are tested and changed at regular intervals. Chemical filters, in particular, tend to become saturated and thus ineffective after they have been in use for a certain time.

- Cell protection filters against aggressive vapours:
- Please consult the filter specification sheet

Novasina offers a special accessory for determining the sorption isotherm of a sample medium. In conjunction with the SAL-T humidity standards, a suitable curve can thus be adopted with the greatest of ease. As such, the **LabMASTER/PARTNER-aw** can also be used for fast, precise and non-destructive water content measurement.



3. Putting Into Operation

3.1. Packaging / Installation

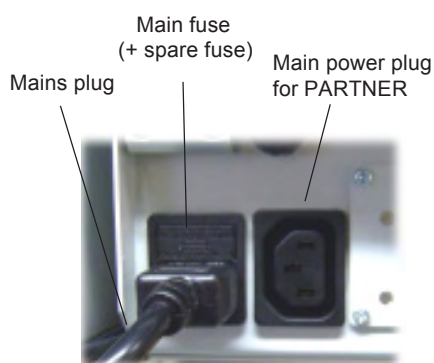
Novasina precision measuring instruments are supplied in sturdy, specially lined cardboard packaging with all necessary accessories. Upon receipt, please check first to make sure everything is present, and immediately notify your Novasina sales partner if anything is missing or broken. Do not put damaged or incomplete measuring instruments into operation.

The equipment must be installed in a laboratory on an even surface, avoiding vibrations, strong heat radiation, air flow and dust.

There must be a perimeter of at least 30 cm of free space around the entire measuring instrument, since it can momentarily give off great heat.

The temperature controller may generate excess waste heat, depending on settings, which is dissipated through the vent holes in the housing and by the built-in fan. The fan is thermostatically regulated. There must be unobstructed air circulation around and especially at the back of the instrument.

3.2. Putting Into Operation



Backside of an LabMaster system

- Check the mains voltage. The instrument accepts 90 - 260VAC, 50/60Hz. Also check that you have the right power cable for your instrument.
- Insert the power cable into the instrument socket and plug it into the mains. Switch the mains power on if necessary.
- Switch on the **LabMASTER-aw** by the power switch on the front of the instrument (lower right corner). The display will light up.

The instrument takes a little time and automatically begins to correct the temperature in the measuring chamber if actual and set values are different.

Note : The Novasina **LabMASTER-aw** consumes very little power and is designed for continuous operation. You may therefore leave the unit switched on even during prolonged interruptions between measurements, so that it is ready for measurement at any time. The precision of the instrument will be stable even after a few hours of continuous operation (internal temperature stability of all electronic components)

After reaching the set chamber temperature, the instrument is ready (it takes approx. 5 min. time). You can now start your first measurement by placing a sample inside, closing the lid of the **LabMASTER-aw** and pushing the Start button on the keypad. The instrument confirms the start with an acoustic signal and the yellow LED above the LCD screen blinks.

For modifying the factory settings (adding users, passwords, buzzer duration etc.), please see chapter 3.6, „System Settings“.

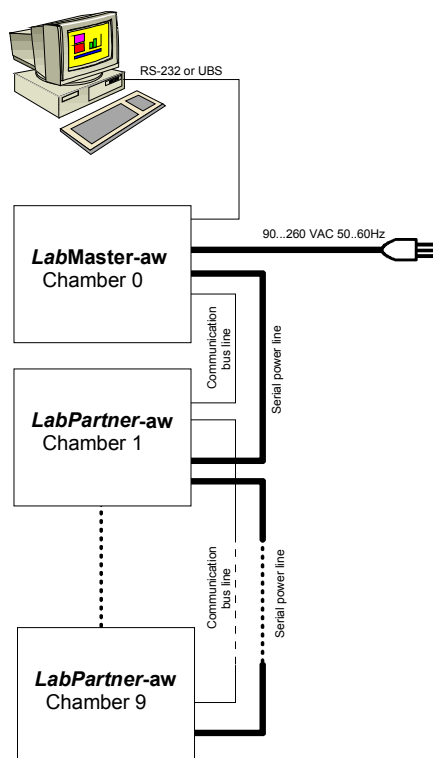


Main switch of the LabMaster-aw



For opening the chamber, push the opener back and press the cover a little bit down!

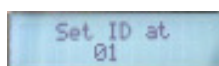
3.3. Adding An Additional Channel (LabPARTNER-aw)



LabMaster-aw Interface



LabPartner-aw Interface



Instrument "ID" of a LabPartner

| All chambers | | | | | |
|--------------|-------|-----------|------|----|-----------|
| | av | Actual °C | Time | av | Stable °C |
| 0 | 0,332 | 29,0 | | | |
| 1 | 0,883 | 23,0 | 6,50 | | |
| 2 | 0,653 | 25,0 | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |

LabMaster-aw multi chamber screen with 2 LabPartner

Once you have switched on the **LabMASTER-aw** „ADVANCED“ for the first time, you can connect one or more **LabPARTNER-aw** units onto the modular system as needed. Please follow the procedure below to do this:

- Switch OFF the **LabMASTER-aw** unit.
- Connect the power cable from the **LabMASTER-aw** to the **LabPARTNER-aw** unit. The power cable can be max. 1.8m long!

Note: The first **LabPARTNER-aw** unit is powered through the **LabMASTER-aw**, all subsequent LabPartners (up to 9 in total) are powered in serial (from LabPartner to LabPartner).

-> To avoid power surges over the instrument's power supply, **LabMASTER-aw** delays the powering on of all connected **LabPartner** units. An acoustic signal is given as each instrument is turned on.

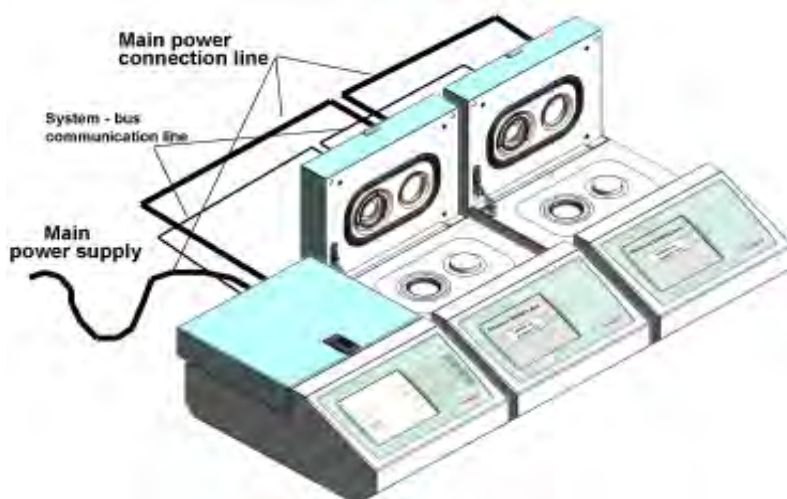
- Switch ON the **LabMASTER-aw** unit.

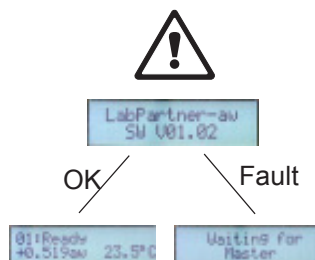
-> Select the desired channel number of the connected **LabPARTNER-aw** (please consult the programming section of the **LabPartner-aw** operation manual)

- Switch OFF the **LabMASTER-aw** unit and connect the communication cable between the **LabMASTER-aw** and **LabPARTNER-aw**.

Note: The connector cable, with 1.8 m cable and corresponding plugs, comes with every **LabPARTNER-aw**. Make sure the cables are plugged into the correct place on the back of the **LabMASTER-aw** and **LabPARTNER-aw**.

- Switch ON the **LabMASTER-aw** unit. The **LabMASTER-aw** and subsequently all connected **LabPARTNER-aw** units are powered on. An acoustic signal and the standard display on the **LabPartner** LCD confirms when they are ready for use (if the **LabMASTER-aw** fails to power on any of the **LabPARTNER-aw** units, the display „Waiting for Master“ appears on the respective **LabPARTNER-aw**). This error can arise due to missing or incorrect cabling to the **LabMASTER-aw** or an incorrectly or duplicated **LabPARTNER-aw** device number.





ATTENTION : A **LabPARTNER-aw** can only be operated with one connection to a **LabMASTER-aw**. All settings to the measuring chamber etc. can only be made from the **LabMASTER-aw**.

An additional **LabPARTNER-aw** instrument may be placed directly beside the **LabMASTER-aw** unit or up to the distance of the cables (1.8m) around it, wherever there is space available. Special systems with up to 9 additional channels may be distributed over different rack levels.

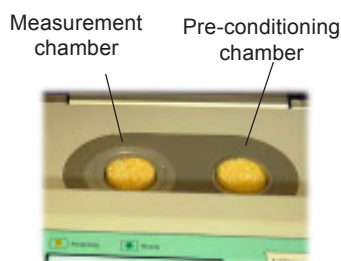
3.4. Quick Start

3.4.1. System Start



While the **LabMASTER-aw System** is starting, a greeting text appears on the display. After about 3 seconds, the display automatically switches to single-chamber measuring mode. Depending on the **LabMASTER-aw** version, „**BASIC**“, „**STANDARD**“ or „**ADVANCED**“, the user may need to identify himself (password) or may be able to commence the measurements immediately.

3.4.2. Quick Measurement Start



Please fill a suitable test sample into a sample cup. Make sure the sample cup is well filled, but not over the lip. Do not compact the sample medium under any circumstances. The greater the overall surface of the sample is, the quicker and more precise the aw measurement will be. Next, place a product sample in the left chamber (the measurement chamber). Place a second sample into the pre-conditioning chamber on the right side. Close the cover and the equilibrium begins to develop. Momentary values of „**aw**“ and „**°C**“ are shown on the display.



Samples at very different temperatures from the chamber : to save time, it is recommended to place the next sample to be measured in the pre-conditioning chamber in order to minimise the temperature difference.



The „stable“- and analyse function may be started with the „**Start/Stop**“ button. The **yellow LED „ANALYSING“** flashes. When the value becomes „stable“, the **green LED lights up**. The system send you as well an acoustic signal, if it will be finished by a "peep". If the cover is opened or was not properly closed, the „**STABLE**“ function is interrupted and the analysing function cannot be started!

3.4.3. Changing the Reading Display



"Single chamber mode"

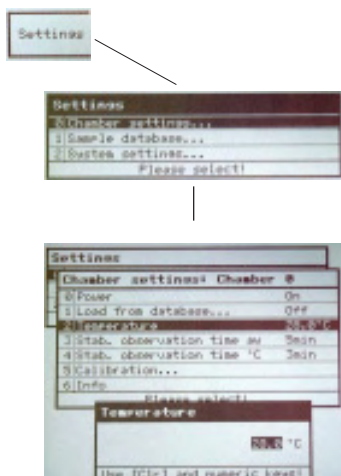


"Multi / summary chamber mode"

Every **LabMASTER-aw** has two different display modes for the current reading. These will be referred to below as „single-chamber display mode“ and „summary chamber mode“. **Single-chamber** mode only shows the current reading from the selected chamber number. This can be changed with the software button „**Select chamber**“. In **summary chamber** display, the current readings of the entire system are shown. At the same time, it can be checked in this display mode which **LabPARTNER-aw** (device No.) a **LabMASTER-aw** is communicating with.

Note : When the instrument is switched on, the last set chamber No. and the actual aw and temperature values are displayed. You can as well check the communication status of all other **LabPARTNER-aw** on the system with the "**summary chamber mode**"

3.4.4. Change Selected "Chamber Temperature"



Push the function key "**Settings**" to switch into the system menu. There you can adjust any chamber-, sample- and systems parameters.

Select the point "**0 : Chamber settings...**" on the screen and press "**ENTER**". The selection can be in two way. Either by pressing „0“ on the keyboard, or moving the highlight up or down using the „**↑**“ or „**↓**“ soft keys and then press „**ENTER**“.

Select on the same way the menu point : „**2 : Temperature**“ by pressing „2“ or moving the highlight up or down using the „**↑**“ or „**↓**“ soft keys and then press „**ENTER**“.

Set the new required chamber temperature (by keyboard) and finish your settings by pressing the „**OK**“ soft key. Return to single chamber mode by pressing „**ESC**“ or many time the function key "**Previous screen**".

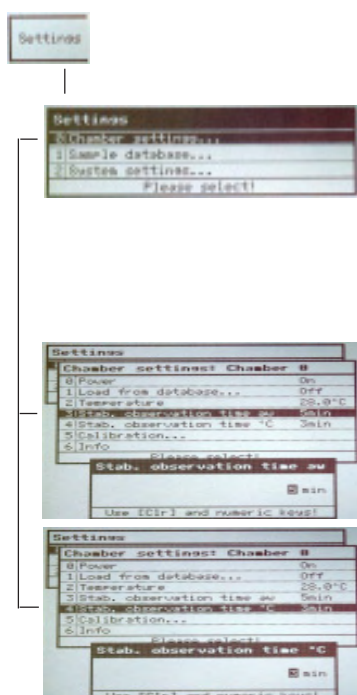
The internal controller system will change now the new chamber temperature.

Maybe the rotation speed of the internal fan will be changed part time and you can hear it a little bit. On the screen you can see, that the temperature of the actual value will move the direction to the new set temperature. This takes a little while. During this time, the chamber system must be closed! A sample or a SAL-T can be inside but the speed of changing will be slower. Please wait during the temperature stabilisation process.



Note : If you are using a multi-channel system (**LabMASTER-aw** and at least one **LabPARTNER-aw**), select the chamber number before changing the settings !

3.4.5. Stability Parameter Setting for Analysis



To optimise the measuring speed of the instrument, it is possible to optimise the stability criteria of the measurement for each sample. Two stability parameters can be set : One for the **aw value** and one for the **temperature in °C**. The range of the stability parameter will be from 1 up to 30 min. To keep within these parameters, the change in measurement reading may not be greater than 0.001 aw or 0.1°C during the set time. If both criteria are fulfilled over the observation time the measurement will be finished and you see the result on the lower part of the screen. Please refer to chapter 5.4 of these operating instructions for further information.

Stab. observation time aw range: 1....30 min
(stable if the aw value deviation is less than +/- 0.001 aw during this time)

Stab. observation time °C range: 1....30 min
(stable if the chamber temperature value deviation is less than +/- 0.1 °C during this time)

4. Description, Instrument Functions

The modular **LabMASTER-aw** system has a great variety of functions, depending on software version and expansion status. These shall be described in detail below. The table below shows which functions are activated in which expansion status. It will be possible to update an "BASIC" or "STANDARD" to the next possible version or directly to a "ADVANCED" version of a Lab**MASTER-aw**. The way is very simple and code driven. A new code can be ordered through your local Novasina representative.

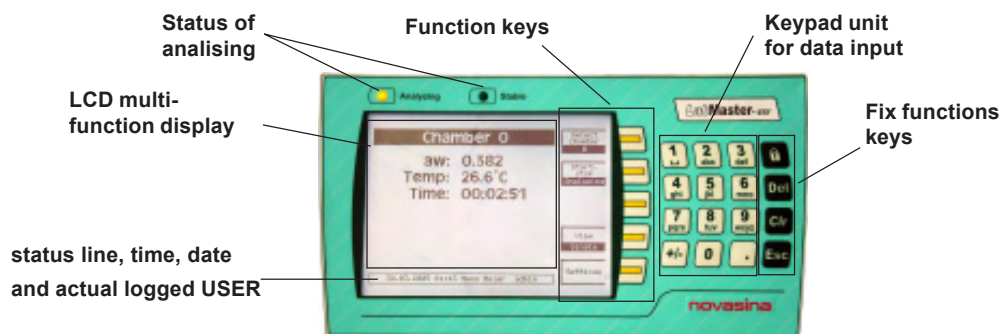
| Functions | "BASIC" | "STANDARD" | "ADVANCED" |
|------------------------------------|---------|------------|------------|
| Date and time | ✓ | ✓ | ✓ |
| Measurement analysing | ✓ | ✓ | ✓ |
| Probe data base | ✗ | ✓ | ✓ |
| Single-user | ✓ | ✓ | ✓ |
| Login / Logout | ✗ | ✓ | ✓ |
| Multi-User | ✗ | ✓ | ✓ |
| User management system | ✗ | ✓ | ✓ |
| Password protection | ✗ | ✓ | ✓ |
| RS-232 / USB communication | ✗ | ✓ | ✓ |
| External printer RS-232 | ✓ | ✓ | ✓ |
| PC software NovaLog32 | ✗ | ✓ | ✓ |
| LabPartner bus line | ✗ | ✗ | ✓ |
| Power ON / OFF (LabPartner) | ✗ | ✗ | ✓ |
| Measurement chamber selection | ✗ | ✗ | ✓ |
| Intelligent sensor, password | ✓ | ✓ | ✓ |
| Calibration at 8 points | ✓ | ✓ | ✓ |
| Unit changing aw/% RH, °C/°F, date | ✓ | ✓ | ✓ |
| Optioncode alignment | ✓ | ✓ | ✓ |

4.1. General Description of the System User Elements

A **LabMASTER-aw** system is used primarily for precise measurement of the water activity of a test sample at an exactly reproducible temperature. It stands out for the following special properties:

- High-precision, temperature-stabilised, active measuring chamber.
- Second pre-conditioning chamber for the following sample.
- Precise, especially developed humidity measuring cells that can be adjusted to the proven Novasina humidity standards at any time.
- High-precision, adjustable stability display.
- Multi-user management system with dynamic administration.
- Multi-chamber management system with dynamic administration.
- Samples database system for efficient lab work.

Main operating elements of the **LabMASTER-aw**:



4.2. Operating the Measuring Instrument

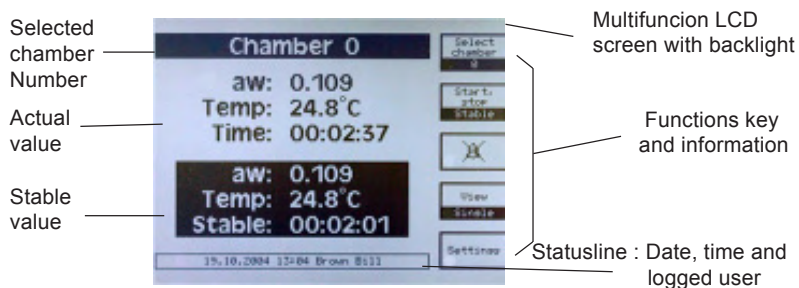
4.2.1. System Startup

The system runs a comprehensive function control of all internal modules and important software components when starting up. After this, the **LabMASTER-aw** tries to establish a connection to any connected **LabPARTNER-aw** units. Any errors in the **LabMASTER/PARTNER-aw** hardware or software are then shown in an information window on the **LabMASTER-aw**.

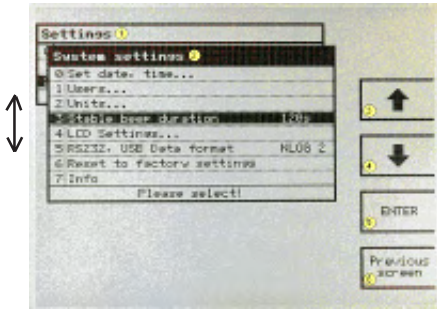
After some seconds, the system is ready to conduct measurements. The screen automatically switches to **OPERATION MODE**. Please note that the system should already be in operation for several hours for exact and reproducible measurements. Only this way can all electronic components have stabilised to the optimum temperature level and be working at highest precision.

4.2.2. The standard „Operation Mode“

Measurements and analyses can be made in this mode. The display can be switched from single-chamber display (chambers selectable by ID) to summary table display. This is very easily done by pressing the soft key „VIEW“ (single / all). When in single-chamber display, the current chamber number can be set and displayed with the „Select Chamber“ soft key. The **LabMASTER-aw** chamber itself is always allocated number „0“.



The chamber numbers of connected **LabPARTNER-aw** units correspond to the set ID numbers of the respective units. It is possible to connect up to nine **LabPARTNER-aw** units with ID No. 1...9 to a **LabMASTER-aw**. The summary display table is created dynamically. Successful communication with the **LabPARTNER-aw** is thus also displayed.

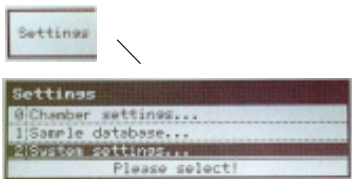
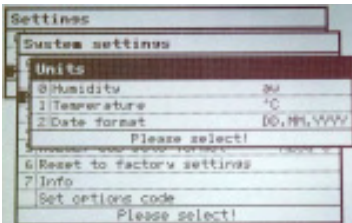
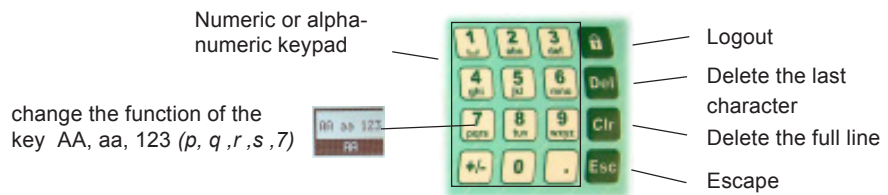


Elements of the configuration menu:

- ① You open the main menu by pushing the „Settings“ soft key.
- ② Selecting a further menu point (e.g. „3“) and then pressing the „ENTER“ (5) soft key brings you to the submenu and the corresponding display window. Pressing the „Previous screen“ soft key (6) brings you back one menu level.
- ③..④ These soft keys let you move the menu selection up or down within the current window.

The selection in this case must be confirmed with the „ENTER“ (5) soft key.

Instead of making a selection with the soft keys, it is also possible to use the keypad for navigating through the various submenus. Each menu point is pre-allocated a number.



In the example given on the left, the „Units...“ function has temporarily been allocated to button 2 on the keypad. If this button „2“ is pressed, the function is the same as selecting the row „Units...“ with the soft keys (3 + 4) and then pressing the „ENTER“ soft key (5).

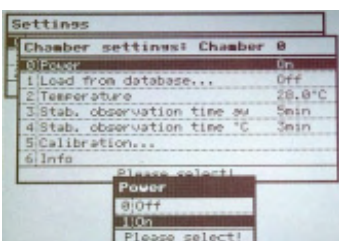
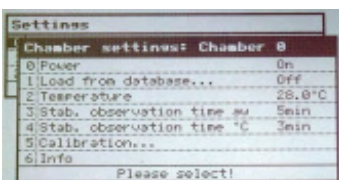
The following device settings are possible for each **LabMASTER/ PARTNER-aw**:

- Chamber settings **Menu point (0)**
- Sample settings **Menu point (1)**
- System settings **Menu point (2)**

4.3. Setting the Instrument

4.3.1. Chamber Settings

(can be set separately for each measuring chamber 0....9, if necessary)



All settings are only ever related to the currently selected measuring chamber with the corresponding number, which is shown at the top right of the screen within the „Select chamber“ soft key.

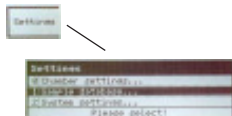
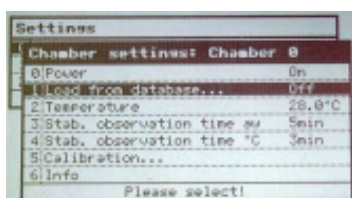
0: Power (power ON / OFF for a selected chamber, only LabPartners 1....9)

0 = OFF for one selected **LabPARTNER-aw**
or **1 = ON** default setting when a system is configured.

This allows to switch ON or OFF the power of the temperature control of an **LabPARTNER-aw**. Please switch OFF the power on a LabPARTNER only if you dont need this during a longer period of days or weeks. Otherwise the chamber takes a very long time (over hours) to become stable before you can measure very precise.

1: Load from database...

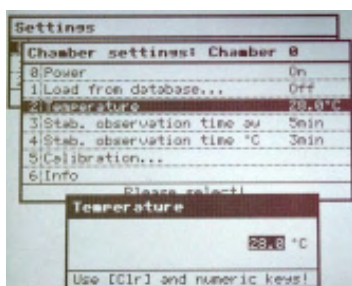
(load one sample parameter set)



So that not all settings need be changed individually for each test sample, all necessary parameters set for a test sample can be saved under a **name** in a database and allocated to a measuring chamber at any time. A database with up to 10 possible test sample data is available for this purpose. (See chapter 4.3. probe data base). As soon as a parameter is subsequently changed, the link to the samples database is unmade and the display shows „OFF“ to confirm this. If a parameter needs to be changed generally for a sample, this should be done in the samples database (see chapter 4.3.1.).

2: Temperature

(temperature setpoint of selected chamber)

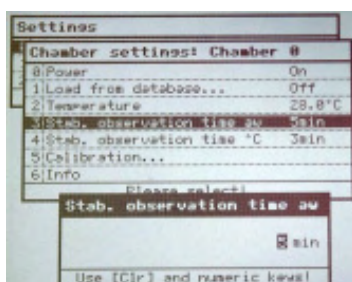


A new nominal temperature value for the selected measuring chamber can be entered with this. Select the menu "**Settings -> Chamber settings -> Temperature**". The internal temperature regulator processes nominal temperatures in the range of 0.0....50.0°C (32.0-122.0°F). Thus, the measuring chamber can be operated at up to 25°C above or below the normal environment temperature (as a rule 25°C).

After changing the measuring chamber nominal temperature, the **LabMASTER/PARTNER-aw** requires some time to settle down to the new chamber temperature. During this time, no exact aw measurement is possible! Every completed input must be confirmed with the „OK“ soft key.

3: Stab. observation time aw

(stability condition of aw value)

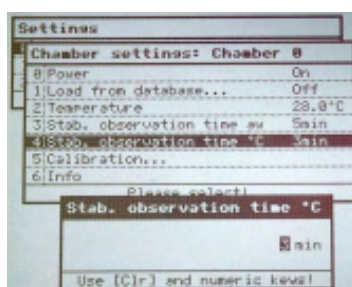


After commencing measurement, the analysis phase of the aw-value sample measuring is activated. The observation time over which the change in aw value must be less than 0.001 aw can be optimised for each sample. Together with „**Stab. observation time °C**“, this is the most important **criteria** that must be met for an exact and reliable stable value display.

The time range of the „**Stab. observation time aw**“ is 1.0....30.0 min. Only whole number values are accepted.

4: Stab. observation time °C

(stability cond. of probe temperature)

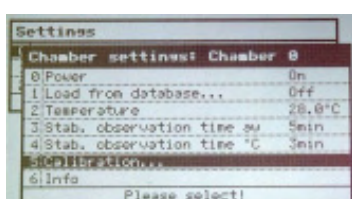


After commencing measurement, the analysis phase of the temperature stability of the sample measuring is activated. The observation time over which the change in aw value must be less than 0.1°C can be optimised for each sample. Together with „**Stab. observation time aw**“, this is the most important criteria that must be met for an exact and reliable stable value display.

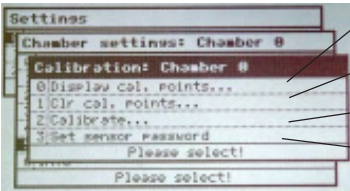
The time range of the „**Stab. observation time °C**“ is 1.0....30.0 min. Only whole number values are accepted.

5: Calibration...

(recalibration with SAL-T standards)



With this function, every **LabMASTER/PARTNER-aw** can be periodically checked and, if necessary, recalibrated using the Novasina humidity standard, SAL-T, at various measuring points. For this purpose, a special box set with 6 SAL-T humidity standards is included with every **LabMaster**. In this box are reusable salt tablets in the form of a sample cup that generate the following humidities: 0.113 a_w, 0.328 a_w, 0.529 a_w, 0.753 a_w, 0.901 a_w and 0.970 a_w.



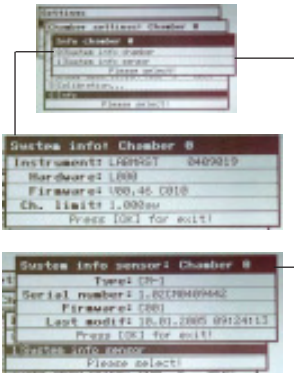
- Display all actual calibration points: Reference and „status of cal.“
- Clear one or all calibration points if necessary.
- Calibrate one point (see chapter 6.4.)
- Protect the calibration with a „sensor password“

Please refer to chapter 6.2. for further information.



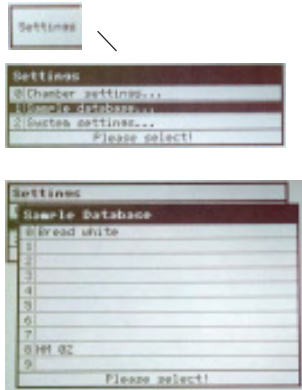
6 : Info (System- and chamber information)

Under this menu point, system information on the **LabMASTER/PARTNER-aw** (depending on selected chamber), and sensor information can be called up. Changes cannot be made.



- Instrument type and serial No. of the instrument
- Hardware revision level: (important for service)
- Firmware / software version: (important for service)
- Currently installed sensor type: (important for replacement)
- Serial number of the sensor: (important for service and warranty)
- Firmware / software version: (important for service)
- Last calibration date/time: (important for maintenance)

4.3.2. Samples Database (Database of max. 10 sample parameter definitions)



The „**Samples database**“ is a powerful tool for quickly and correctly setting all necessary parameters of a measurement relating to a type of sample. Up to 10 different samples can be defined. The name of the samples database can be chosen freely. A „**Default sample**“ was already created by default. This can be written over, added to or deleted as required.

To create further sample data in the database, please select a free table space by pressing the soft key „**0-9**“ or the corresponding number on the keypad. After this, the system prompts you to enter a suitable name (confirm with „**ENTER**“). Now, the appropriate parameters for the sample can be entered and finalised by pressing the „**ENTER**“ key.

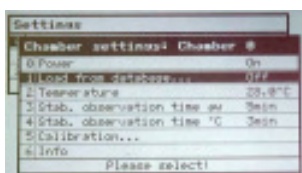
Sample data is modified in the same way as it is created.

The following parameters must be entered as sample data:



- Obvious name of the sample: (max. 21 characters)
- Set chamber temperature for this sample: 0....50°C
- Stab. observation time aw for this sample: 1....30 min.
- Stab. observation time °C for this sample: 1....30 min.

If sample data is no longer needed, it can be deleted. Select the corresponding row in the samples database table (->**ENTER**) -and then delete the corresponding name by pressing "**Clr**" key. This frees up the table space for new sample data.



The sample data are allocated to a measuring chamber in the menu „**Chamber settings**“ under point „**1 : Load from database**“. There, the desired sample data can be allocated to the respective measuring station. The deallocation is done under the same menu.

The link to the sample data is also automatically unmade as soon as a parameter is subsequently changed in the „**Chamber settings**“ menu. (see status from „**Load from database**“)

Status: **OFF** (means no link to the sample data exists)
 Status: **0...9** (a link to the sample data exists)

4.3.3. Printer functions for external printer



From the software version V.1.05 C003 all **LabMaster-aw** system have the ability to print out information about measurements and calibration on a printer. The software supports the protocol standard ESC/P. Novasina recommends following printer models:

Seiko DPU 411 and 414 thermo paper printer
 (only by RS-232 interface)

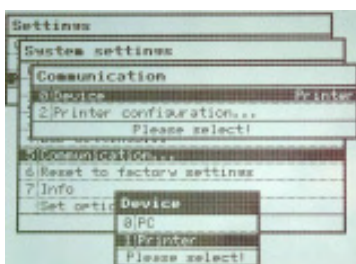
Protocol printout

If you have connected by a RS-232 interface a printer to the **LabMaster-aw** system and you have configured the device following chapter „**printer settings**“ the system prints out the results automatically as soon as a stable value is reached. Actual measuring values of all connected measuring chambers are printed by pushing the button 0....9 on the **LabMaster-aw** during the standard operation mode.

- In the „**Stable protocol**“ values are printed out that were valid at the time of stability. Attention: on the protocol the user name who is momentary logged in will be printed out as well.
- In the „**Actual protocol**“ values are printed out that were valid at the start of the printing process.

General system settings (function extensions)

After the connection of the main supply and printer cable (RS-232, part no. 111 7473), all printing functions have to be activated by the **LabMaster-aw** software. This shall be done as following:



Communication:

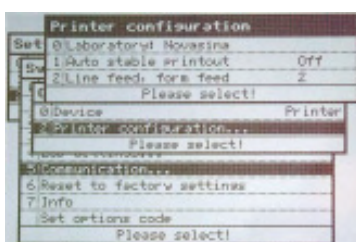
„**Settings**“ → „**System settings**“ → „**Communication**“, activation by selecting the menu point „**Printer**“. For de-activation please select the menu point „**PC**“ (selection for a connection with the **NovaLog MC** software).

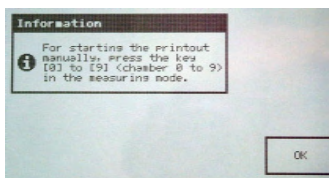
Printer communication:

„**Settings**“ → „**System Settings**“ → „**Communication**“ → „**Printer-configuration**“. This menu point is only visible, if the „**Device**“ is set on „**Printer**“.

The following parameters can be selected:

- „**Laboratory**“:
 Laboratory or company name, which should be printed on the protocol.





- „Auto stable printout“ :
If setting is „On“ the measured values are printed out automatically after reaching the stability (as soon as the green LED is flashing).
- „Line feed, form feed“:
Selection of the number of empty lines after the protocol. With that function you can define the right position of the paper tear off line. If there is no number input (delete „0“ → „FF“), a one page feed will be performed.

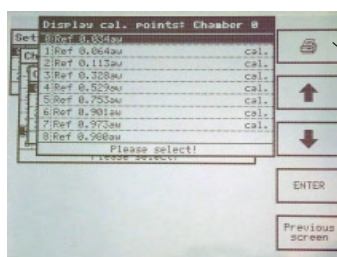
Back to operating mode :

If you want to quit the menu after selecting „Printer“ under menu „Device“ there is a information window confirming that actual printouts can be started by selecting a button (0...9). This shall be confirmed by pressing the function button „OK“.

Printing of calibration data

Prerequisite : **Activation** of the printer function in the „System settings“

If the **LabMaster-aw** is configured on a printer, single or all calibration points can be printed out by selecting the **printer function button** under the menu point „Display cal. points“.



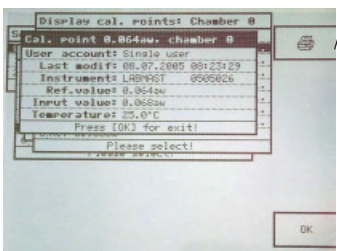
Settings on the measurement chamber

„Settings“ → „Chamber Settings“ → „Calibration“

→ „Displ. cal. points“ or

→ „Displ. single cal. points“

If you press the **printer function button** in the **general view**, **all calibration points** will be printed out (adjusted and not adjusted points) and information about date, time, instrument and user of each single point will be also printed. If you select the **printer function button** in the **single view**, only selected **calibration points** will be printed.



Printouts on Seiko Printer

```
*****
*      N O V A S I N A      *
*      Water activity meter  *
*****

LabMaster-aw:   SW version 1.04
User account:   Default user

Chamber 9:     SW version 1.05
Serial number: 0504004

Sensor Type:    CM-2.06
Serial number: 0504004
last modif:    10.06.2005 11:21:00

Laboratory:     Schnyders Labor

Product:        .....

Batch no.:      .....

Sample file:     Fleischwaren
Stab. obs. time: aw: 5min   °C: 1min

Date, time:      14.06.2005 13:00:00
Duration:        00:00:05
Temperature:     25.0°C
Stable:          aw 0.388
```

"Stable" Protokoll

```
*****
*      N O V A S I N A      *
*      Water activity meter  *
*****

LabMaster-aw:   SW version 1.04
User account:   Default user

Chamber 9:     SW version 1.05
Serial number: 0504004

Sensor Type:    CM-2.06
Serial number: 0504004
last modif:    10.06.2005 11:21:00

Laboratory:     Schnyders Labor

Product:        .....

Batch no.:      .....

Sample file:     Fleischwaren

Date, time:      14.06.2005 13:00:00
Time:            00:00:05
Temperature:     25.0°C
Actual:          aw 0.388
```

"Actual" Protokoll

```
*****
*      N O V A S I N A      *
*      Water activity meter  *
*****

LabMaster-aw:   SW version 1.06   C003
User account:   Default user

Chamber 9:     SW version 1.06   C003
Serial number:  LABMAST 0409011

Sensor Type:    CM-2.07
Serial number: 0504004
last modif:    10.06.2005 11:21:00

Laboratory:     Schnyders Labor

Cal.point:      0.064aw   (Calibrated)
User account:   Default user
Last modif:     22.06.2005 06:09:00
Instrument:     LabMast 0409011
Ref-Value:      0.064aw
Input Value:    0.066aw
Temperature:    25.0°C
```

"Single cal.point" Protokoll chamber 9

Accessories for printer - *LabMaster-aw*



Printer cable

Novasina offers a cable set for Seiko printers, which enables to connect a **LabMaster-aw** to a Seiko DPU-411 or DPU-414 printer. The cable length is 1.5m.

Novasina part no. : **111 7473**

This cable is not included to the **LabMaster-aw**!

The printer functions can be used on all versions „BASIC“, „STANDARD“ and „ADVANCED“.

Printer settings

IS ONLY VALID FOR A thermo paper printer !!

- **SEIKO DPU-411** or
- **DPU-414**



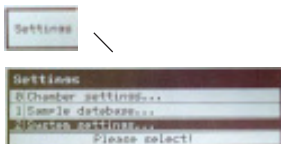
A ESC/P compatible printer shall be connected to the RS-232 interface of the **LabMaster-aw**. Novasina recommends the **Seiko DPU-414** printer with following settings:



| | | |
|------------|-------|---------------------------|
| Dip SW-1/1 | (OFF) | Input = Serial |
| Dip SW-1/2 | (ON) | Printing Speed = High |
| Dip SW 1/3 | (ON) | Auto Loading = ON |
| Dip SW-1/4 | (OFF) | Auto LF = OFF |
| Dip SW-1/5 | (ON) | Setting Command = Enable |
| Dip SW-1/6 | (OFF) | Printing |
| Dip SW-1/7 | (ON) | Density |
| Dip SW-1/8 | (ON) | = 100% |
| Dip SW-2/1 | (ON) | Printing COLUMNS = 40 |
| Dip SW-2/2 | (ON) | User Font Back-up = ON |
| Dip SW-2/3 | (ON) | Character Select = Normal |
| Dip SW-2/4 | (ON) | Zero = Normal |
| Dip SW-2/5 | (ON) | International |
| Dip SW-2/6 | (ON) | Character |
| Dip SW-2/7 | (ON) | Set |
| Dip SW-2/8 | (OFF) | U.S.A. |
| Dip SW-3/1 | (ON) | Data Length = 8 bits |
| Dip SW-3/2 | (ON) | Parity Setting = No |
| Dip SW-3/3 | (ON) | Parity Condition = Odd |
| Dip SW-3/4 | (OFF) | Busy Control = XON/XOFF |
| Dip SW-3/5 | (OFF) | Baud |
| Dip SW-3/6 | (ON) | Rate |
| Dip SW-3/7 | (ON) | Select |
| Dip SW-3/8 | (ON) | = 9600 bps |

Dip SW-3/1 through Dip SW3/8 of the Seiko DPU-414 printer have to be set following the table above. The settings of all other switches are just a recommendation.

4.3.4. General system Settings

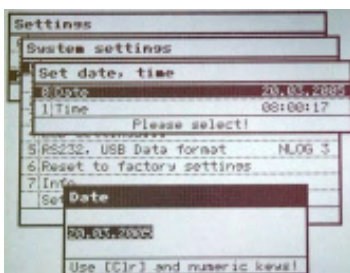


Various generally valid parameters that cannot be allocated to a measuring chamber are managed in this module. The multi-user administration, password allocation and access protection can be defined here. All of these settings depend on the **LabMASTER-aw** version, „**BASIC**“, „**STANDARD**“ or „**ADVANCED**“. Such parameters may be able to be entered only partially or not at all, depending on the model.

(see list on page 14, chapter 4)

0 : Set data, time...

(System settings only for **LabMASTER-aw**)



Each **LabMASTER-aw** has an internal clock and calendar function that continues to run even while the unit is switched OFF. By default, the system is set to GMT (*Greenwich Meridian Time*). This parameter should be set to local time and current date after first starting up the system. The easiest way to do this is with the keypad beside the display. Please separate day, month and year or hours, minutes and seconds with a dot [.] and conclude the input with „**YES**“.

The displayed date is in the European format with the pattern:

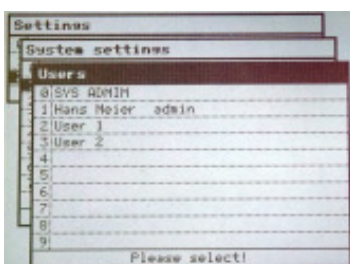
DD.MM.YYYY (e.g. 17 April 2005 = 17.04.2005)

The displayed time is in 24h format with the pattern: hh.mm.ss

(e.g. 16:45:50 = 04h PM, 45min, 50sec.)

1 : Users...

(only for **LabMASTER-aw** „**STANDARD**“ and „**ADVANCED**“)



Every **LabMASTER-aw** „**STANDARD**“ and „**ADVANCED**“ gives the option of a Multi-User Management system. If a **USER** wants to measure an **aw-Value** on the system unit, he must first log in with User ID and a password. As soon as all measurements are finished, he must log OFF of the system again by pressing the "Logout-key".

Up to 10 users can be defined with name and unique password and their rights managed.

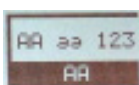
By default, a „**Sys Admin**“ is set without password protection. These rights are required for the administration. One person must be responsible for managing the system as **administrator**. This person should immediately write over (*rename*) „**Sys Admin**“ with his name and protect his administrator rights with a password. The „**Username**“ and the password can be entered using the keypad.

Swapping from numeric keys to upper or lower case letters is done with the function button at the top right.

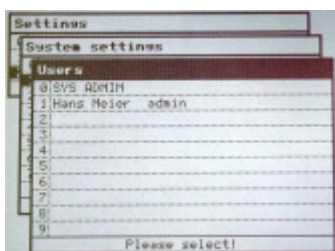
Please keep your password in a **safe place**. A forgotten administrator password can only be deactivated in the Novasina factory or at an authorised Novasina service centre. If this is so, then all saved parameters and data will also be irretrievably lost. The instrument will then be put back to its original factory default condition.

Please be careful with **UPPER** and **LOWER** cases and **NUMERICAL** input when entering a password.

Note: Use only numerical characters for the password. This simplifies input and is less likely to be forgotten!



Defining a user



To define a new user in the system, select a free space in the table (e.g. No. 3) using the soft keys or the keypad.

Then, you can enter the new user name and finalise it with „**ENTER**“. Next, you will have the option of allocating different rights (see „User Rights“ below) for the respective user. The status (active = **YES** ; inactive = **NO**) is shown. This action is terminated with the key „**Previous screen**“.

User Rights



The user management system gives the administrator the option to allocate each entered user different rights. The table below gives an overview of the rights currently possible. These can be extended in future. Please consult the current user management system while allocating rights.

| User level system | Measurement | Chamber ON / OFF | Chamber p parameter | Chamber Calibration | SET Sensor password | User management system | Probe- data base | General system factory reset |
|-------------------------|-------------|------------------|---------------------|---------------------|---------------------|------------------------|------------------|------------------------------|
| Administrator | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| PERMIT Calibration | Yes | Yes | No | Yes | No | No | No | No |
| PERMIT Sample data base | Yes | Yes | No | No | No | No | Yes | No |
| PERMIT Chamber setting | Yes | Yes | Yes | No | No | No | No | No |
| General permission | Yes | Yes | No | No | No | No | No | No |

Deleting a User

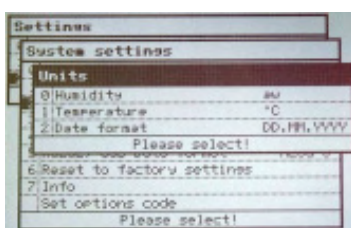
A user can be deleted from the administration by deleting the user name. There must be at least one „**Administrator User**“ defined at any time, however, otherwise the system will be locked completely. Only administrator rights allow the deletion of users or passwords.

User Password

When first entering a new user, the password must be entered **twice time** (to confirm). This helps make sure the password is entered correctly.

The administrator can see a forgotten user password in the Management system. (see „User“ -> „1: Password“)

2 : Units... (for all LabMASTER-aw versions)

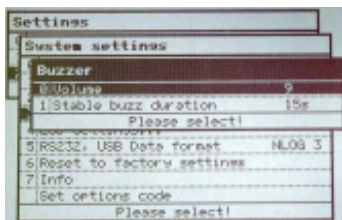


A **LabMASTER-aw** can display the measured values in various different units. The values are as follows:

Humidity : **aw-value** or **relativ humidity % RH**
 Temperature : **°C** or **°F**
 Date format : **DD.MM.YYYY**, **MM.DD.YYYY** or **YYYY.MM.DD**

There are three different date displays to select from.

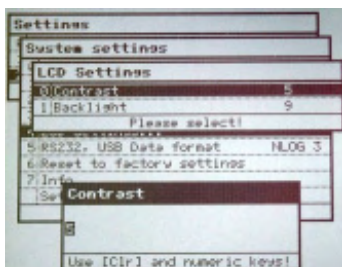
Examples : **DD.MM.YYYY** = 03.05.2005 (3 May 2005)
MM.DD.YYYY = 05.15.2005 (15 May 2005)
YYYY.MM.DD = 2005.05.27 (27 May 2005)



3 : Buzzer... (for all LabMASTER-aw versions)

The volume and duration of the acoustic signal upon attained stability can be set with this.

Volume : **noise** 0...9 : 0=low 9= high
Stable buzz duration : 0...120 sec. : 0 = OFF

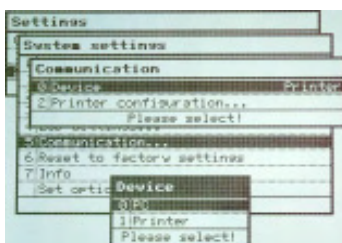


4 : LCD Settings... (for all LabMASTER-aw versions)

The contrast and backlighting can be individually adjusted for optimum screen readability.

Contrast : 0...9
Backlight : 0...9 : 0 = OFF

Since the backlighting is LED lighting, it is always switched on. This does not affect the service life of the instrument.



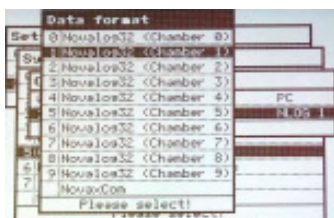
5 : Communication.. (abilities of LabMaster-aw versions page 14)

It is possible to select various special output devices depending on which firmware version is being used. Currently the **PC** and **Printer** devices are defined. With the PC device, LabPartner units (1...9) can be connected parallel over the **LabMASTER-aw**, the main unit, to a PC that is running the **"NovaLog MC"** analysis software and thus data transmitted online.

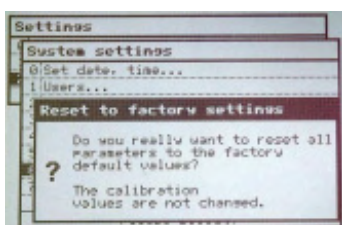
If you set the **Printer** device and a printer is connected and configured with a LabMaster-aw over the RS-232 interface, a protocol can be printed out. It is possible to print out the "stable" or "actual" protocol. Further settings for the printer or the protocol can be made under "printer configuration".

If the **Printer** device is set, there is the possibility to print out a single or several calibration points by pressing the printer function button under "Display cal. points".

Should, for example, the measurement data from the **LabPARTNER-aw** with measuring chamber No. 3 be printed out over **NovaLog MC** or the **Printer**, it can be activated using key "3" (or selection by arrow keys).



Under menu point **Data format** you can either select a single channel over **NovaLog32 (Chamber x)** or you can select the **NovaxCom** format for the new software **NovaLog MC**.

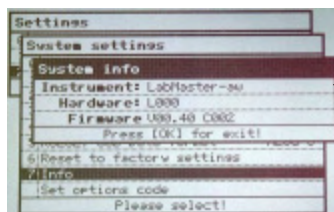


6 : Reset to factory settings (for all LabMASTER-aw versions)

This function resets the entire system (**LabMASTER-aw** and, where applicable, also **LabPARTNER-aw**) to the original status upon delivery. This function can only be called up by the user with administrator rights. All settings of the user management system will be **irretrievably lost**. Only the serial and software licence numbers („**BASIC**“, „**STANDARD**“ or „**ADVANCED**“), and the data based on the sensor, such as adjustments, will be retained. To prevent unintentional deletion, it must be confirmed twice whether all settings shall really be reset to default settings or not. The first prompt must be answered with „**Yes**“ and the second with „**NO**“ for this reset function executed.

7 : Info (for all LabMASTER-aw versions)

This menu point contains general information on the hardware and software of the **LabMASTER/PARTNER-aw**.



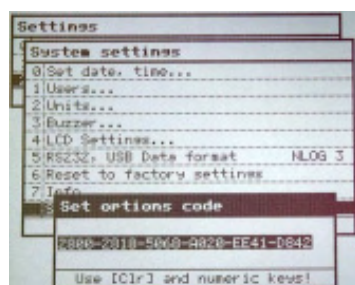
Instrument ID : **LabMaster-aw**
 Hardware : L001
 Firmware : V.01.07. C003 (date : 08/05)

This information is very important for the service centre to be able find errors and functions. It also allows any system updates to be retraced. Please keep this information at hand whenever contacting your service centre.

8 : Set options code (for all LabMASTER-aw versions)

System expansion : „BASIC“ -> „STANDARD“ -> „ADVANCED“

This function allows you to equip a **LabMASTER-aw** with extended functions (see "4. Function description"). Doing so requires the currently set and readable **CODE** to be provided to a Novasina representative. The representative will then unlock the corresponding software functions with a new CODE. The new CODE is a product from the old CODE and the new function you need. Please send your actual CODE of the system together with an order to your local Novasina representative. This software extension comes at an extra charge.



Keep the current code in a safe place. This code only ever relates to one specific **LabMASTER-aw** unit. The CODE will be as well on the software certification paper. Please add the new CODE as well to this paper. The code must always be presented for any repairs. Only so you can be certain that the same functions will be available after repair.

A label on the **LabMASTER-aw** gives information on the system code of the delivered unit. Please complete this if needed.

5. Water Activity Measurements

5.1. Carrying Out "aw"-Measurements

- Switch on the **LabMASTER-aw** as described in chapter 3.2. After reaching the chamber temperature, the instrument is ready for measuring the sample. For a high precision measurement, the system must run hours before you can start the measurement. The temperature of the complete system must be stabilised first.
- Fill the sample cup with the material to be measured. The sample cup must be completely clean and dry (rub dry with tissue paper if necessary)! Ideally, always use a fresh cup and dispose of it after use.

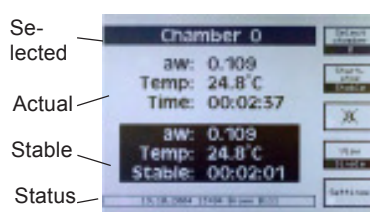


Important ! Fill the sample cup to approximately 2/3 with the product to be measured. **Do not overfill the sample cups !** Bulkier material must be suitably crushed or manually cut into small pieces. Products consisting of several layers, or an outer coating, must also be crushed (e.g. confectionery products). Prolonged hand contact with the product must be avoided (falsification of measured value!). A grinder, if used, must not warm up the product.

- Open the instrument cover and check the chamber inside. This must be clean and absolute dry.
- Make sure an appropriate cell protection filter is installed in front of the measuring cell unit, should the product sample require such protection measures. For details, please consult the filter specification sheet.
- Insert the open sample cup containing the sample into the measuring chamber (left) and close the cover again. Press the cover completely down, otherwise the analysing function does not start.

Note : To gain time for measuring the next sample while measuring the current sample, place the next sample cup (with its plastic cover closed!) into the preconditioning chamber (right) to reach thermal equilibrium, before closing the instrument cover.

Displayed values

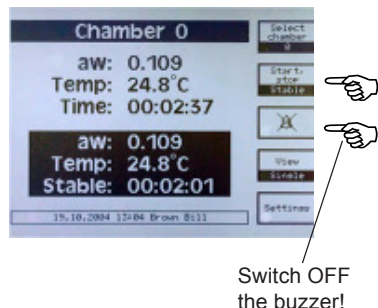


The Novasina **LabMASTER-aw** continuously measures the **water activity** (a_w / %RH) and the temperature (°C/°F) and displays the momentary values with bigger letters on the screen. If an analysing of a probe will be finished, the system will fix the result. This result will be presented it with an inverted display part on the lower part of the screen. The upper part will show the actual value of the measurement at any time. So you can see after a while how good the stability parameter are adjusted for this probe.

Activating the stability observation function

Press the **<Start/Stop/Stable>** key; the **yellow LED** („Analysing“) flashes. The stability observation function is activated. The elapsed time, aw value and chamber temperature appear on the display.

As soon as the measured values are considered stable, the **buzzer sounds** and the green LED „**Stable**“ lights up. The display now also permanently shows aw, temperature and elapsed time at that moment. This information disappears as soon as the cover is opened or the **<Start/Stop/Stable>** key is pressed again.



Removing the measured sample

- Open the instrument cover after ending of the analysing and after writing down the result.
- Remove the sample cup from the measuring chamber carefully. Do not empty out any part of the sample.
- The instrument cover shall be closed now. This helps you for a next quick measurement.



Note : If heavy concentrations of glycol, glycerine, acetic acid etc. were present in the sample, leave the cover open to let the cell and its protection filter recover in the air.

- If you want to measure the next sample, take it from the pre-conditioning chamber, open the cup (remove its cover) and place it in the measuring chamber. The following sample may be put into the pre-conditioning space before closing the instrument cover.



Note : Leave the instrument switched on so that it is ready to measure at any time. The power consumption is very low.

If a product sample has a greatly different temperature from that of the chamber, a temperature gradient inside the chamber may retard the temperature equilibrium, thus also the a_w value. The instrument measures the different temperatures inside the chamber very accurately and can detect a large gradient of temperature. It may then display the following text: **"reaching stability is retarded due to too great a temperature difference inside the measuring chamber"**. Then you need to wait till the temperature of the sample will be the same like the chamber temperature. After that start the analysing again.

5.2. Important Notes About The Sensor

General



The sensor supplied with the Novasina **LabMASTER-aw** was factory tested and then calibrated at the following **seven** a_w -value reference points : **0.064 a_w , 0.11 a_w , 0.33 a_w , 0.53 a_w , 0.75 a_w , 0.90 a_w and 0.97 a_w .**

Humidity sensors are subject to certain ageing phenomena, which manifest themselves in deviations from the original value. For the most part, these deviations can be compensated for by recalibration. We therefore recommend you to periodically check the accuracy at the humidity reference points and to recalibrate the instrument if required.

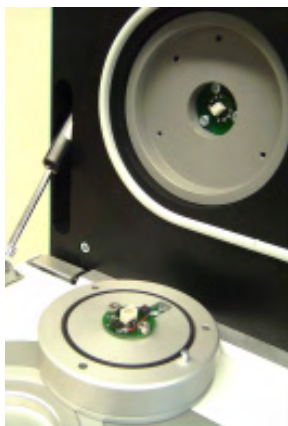
Correct handling of the sensor



Note : Before starting the measurement. The Novasina sensor is a highly sensitive precision device. Please observe the following rules in order to avoid measuring errors or even destruction of the sensor :

- Do not physically shock or dip sensors into liquids. If the CM-2 sensor is dropped down, it will be damaged or this result can be wrong!
- If substances with aggressive acidic vapours are present, the sensors must be protected with a chemical pre-filter system. Contact you local Novasina dealer for the suitable filter protection. Otherwise the system might drift away permanently.
- Condensation (*saturation humidity 100 %rH*), which can be caused by sudden temperature changes, should be avoided.
- Sensors that are not in use should be stored in a dust free, neutral atmosphere at room temperature and ambient humidity (both chambers in the instrument must be empty before switching OFF the power of a **Lab-MASTER/PARTNER-aw**).





- Never open or take the measuring cell apart or clean the sensor with any chemical or mechanical parts! The sensor itself is not cleanable. All attempt will expire the warranty.
- Under no circumstances connect the sensor to an Ohmmeter or such like. This may damage the sensor and will expire the warranty of the sensor!

Any warranty will expire if one or more of these points counteracts !!

Measurements up to $\pm 1.000 a_w$

The sensor is capable of measurements up to $1.00 a_w$ (100%RH). A built-in heating system protects the measuring cell from saturation and therefore against destruction.

The following points must be borne in mind :

- The instrument must be switched on before a product sample is placed into the measuring chamber. Please wait until the instrument has reached the chosen chamber temperature.
- At the same time, the **next sample** can be placed in the pre-conditioning chamber to reach the same temperature before it is measured.
- **Always first remove** the sample from the measuring chamber before an instrument is switched OFF.

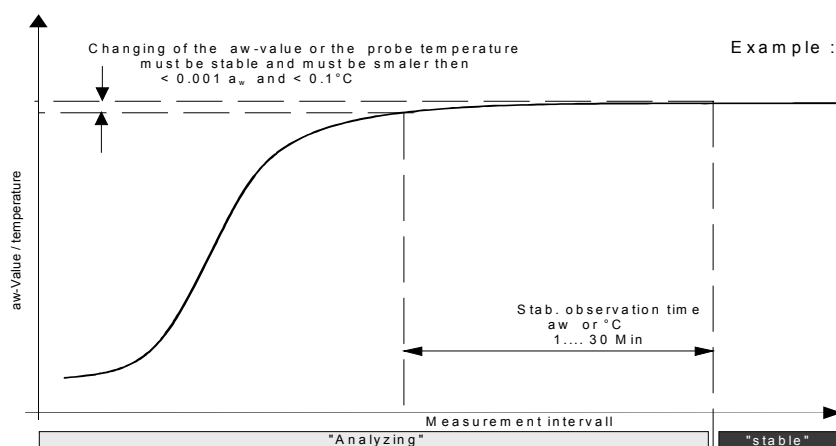


Note : If possible, always leave the instrument switched ON. The integrated heating system protects the sensor from saturation and the instrument is always ready for the next measurement. At the same time, the next sample can be preconditioned to the correct temperature. The power consumption is extremely low.

5.3. Function Principle of Stability Observation

The stability observation function, if activated, observes the changes in **aw** and **temperature** value. Stability will be shown when the change within a selected time frame is less than the accuracy of the instrument, which is **0.001aw** and **0.1°C**.

The shortest **time window** is **1 minute** (stability time factor 1), the longest window is **30 minutes** (factor 30). At factor 1, stability will be reached the fastest, but the aw value may be too far off the requested accuracy of the final stable aw value. At factor 30, the highest accuracy is attained.



5.4. Setting Stability Observation Time Factors

- Go to the menu "**Settings**" -> "**Chamber Settings**" if two or more channels are used -> "**Select chamber**" number first. Select (3) for the "**stability observation time factor**" for **aw**, or select (4) for the **temperature observation time factor**.
- You will see some values from experience in the table below. After several tries, you can select the best time factors for your samples, possibly also using the **NovaLog MC** analysis program.
- The "**aw stability observation time**" is the interval of time in which the measured value may still vary by a minimum value, though less than 0.001aw resp. 0.1°C, such that the instrument assesses it as „**stable**“.



Factory setting for „**aw**“ : 1 (= 1 minute, shortest time interval)
 Factory setting **temperature** : 5 (= 5 minutes)
 Factor setting range : 1 minute....30 minutes

| Recommended stability Examples of products | time factor (minutes) | |
|---|-----------------------|-------------|
| | aw | temperature |
| Fruit jams, tomato sauces | 1 | 2 |
| Chocolate, salmon, pharmaceuticals | 2 | 3 |
| Dried meat, pastry products | 3 | 4 |
| Clear soups/stock concentrate | 4 | 4 |
| Cheese | 5 | 5 |
| Butter | 7 | 8 |
| Sunflower oil | 30 | 10 |

Recommendation : There are two ways to found the optimum of the stability factor. The optimum means, a good balance of the measurement between speed and accuracy. Either you can analyse the curve of the **NovaLog MC** for this probe or you can look it on the screen of the **LabMASTER-aw** or analyse the difference between the actual value and the stable value. For quickly attaining a „**stable**“ value, we recommend selecting the aw stability factor „1“, but then continuing to measure and observe a **change** in the **aw value** after the „stable“ value has been displayed. Many food products need a certain period of time to free the water molecules and reach equilibrium. If you decide that the „stable“ value deviates too much from the final value, then the stability factor may be increased.

Please check as well the temperature. This must be absolute stable and on the same level than the temperature of the chamber. Otherwise any adjusting of these parameter will be wrong.

The **temperature** stability observation time may also be changed from the factor „5“ set by Novasina to a higher factor for products with a temperature greatly different from that of the chamber (e.g. chilled samples).

5.5. Recording Desorption and Adsorption Curves

Most materials and all food products contain water. There are two different kind of water in a probe. A part of bounded water and free water. A **LabMASTER/PARTNER-aw** measure only the part of free water into a probe. But there is a compounding between the part of free water and bounding water of a probe. The "**Sorptions isotherm**" chart gives the depending of both factors. Such chart are valid and unique only for one type of probe. Novasina has created a special "SI" set. For such purposes using this set in combination with a **LabMASTER/PARTNER-aw**, you can record such "**Sorptions isotherm**" for a product.

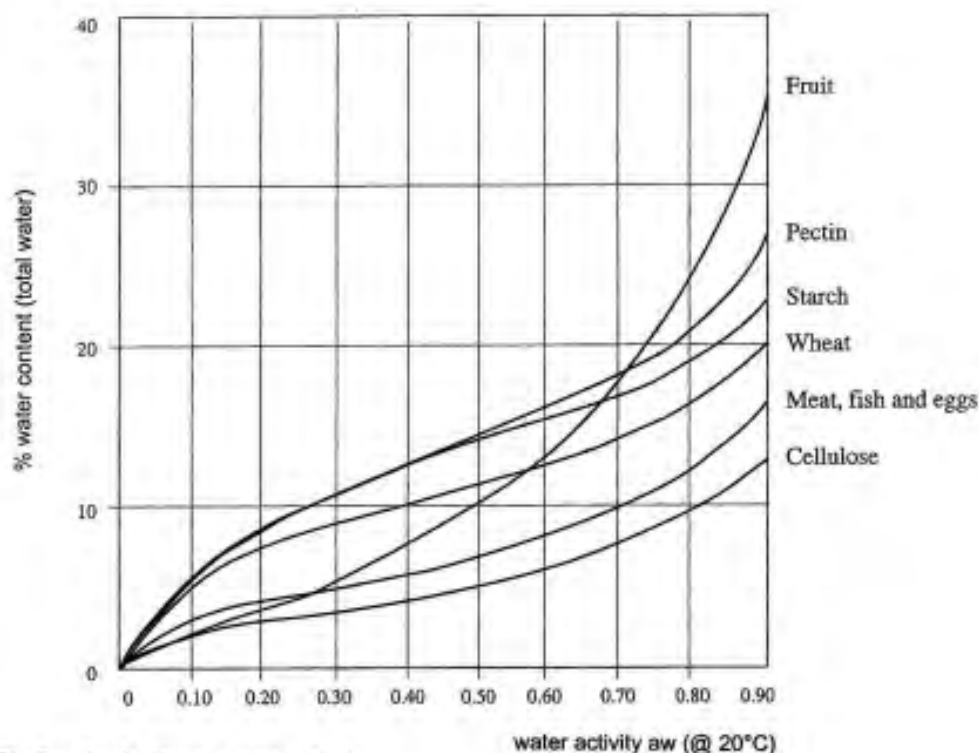
Definitions :

The WATER or MOISTURE CONTENT is the **weight** in % of the *total* water in a product. Test methods are e.g. Karl Fischer Titration, or drying balances.

The WATER ACTIVITY, a_w , is the free water – the only value that gives information on the **micro-biological safety** of a product and especially important for foodstuffs.

In materials, it is called the RELATIVE EQUILIBRIUM HUMIDITY (% rh). The range of 0.00....1.00 a_w corresponds to 0....100% rh.

The relationship between moisture content and water activity is the SI, Sorption Isotherm curve, which is *product and temperature specific*. An absolutely constant temperature during all measurements is therefore very important!



SI - Sorption Isotherm curves of foods
(also called water vapour isotherms)

Examples of SI-curves:

Recording a Sorption Isotherm curve

Setup the *LabMASTER/PARTNER-aw*

The lower part of the probe chamber of a *LabMASTER/PARTNER-aw* must be prepared first. Change the standard steerage to the special steerage for SI set. Take a screwdriver No. 2 and replace the steerage (see pictures below). Be careful regarding a deformation of the steerage that might affect a correct measurement.



Measure the precise weight of the special probe cap including the transportation glass container. This is important for the net weight definition after changing the weight following the humidification of the probe.

Preparing a probe : Fill the special metallic sample cup to 2/3 with the crushed probe (in order to get the maximum possible surface). Keep your probe always inside the glass container when you are not using it for measurements inside the chamber.

Adsorption curve

In order to start, the substance must be dry, so it must first be totally desiccated in an oven (e.g. 2 hours at 102°C, depending on the material).

1. Close the glass container immediately after taking it out from the drying oven and for transportation.
2. Weigh the probe afterwards with the closed weighing glass on a precision balance and define the net weight of the probe.
3. Put first the SAL-T 6 in the deeper measurement chamber and afterwards the probe inside the stainless steel basket over it and close the chamber.
4. After about one hour or more, write the a_w value. If you wait longer, the a_w value as well as the weight become higher, moving along the SI-curve. Therefore the „**equilibration time**“ is not critical.
5. Weigh the probe again and write the net weight in a table and calculate the difference between the weights before and after humidification.
6. Put the next SAL-T into the measurement chamber and perform the same operation at point 2, 3 etc. up to the SAL-T 97 humidity standard.

Based on the acquired data you can define and print the "**Adsorption curve**" for a specific product on a paper !

Desorption curve

This is in principle the inverse part of an adsorption curve. The substance must be more humid when starting to weigh (to be safely on the desorption curve to avoid SI-hysteresis mistakes), so the first salt to use is SAL-T97. Upon reaching a value well above 0.9, SAL-T90 can be placed in. After about one hour or more, note the a_w value and weigh the substance. Upon waiting longer, the a_w value as well as the weight are lower, moving along the SI-curve, so the waiting time is not critical.

After that, place in SAL-T75, down to SAL-T6. Then, after totally drying the substance in the oven, the net (dry) weight is known and all points can be plotted.

How to proceed :

1. Weigh the tare (empty substance basket and weighing glass)
2. Lift up the cup with a screwdriver; push the deeper cup into place
3. Place in the first SAL-T standard
4. Place basket with substance on top
5. Now close the cover and select the desired chamber temperature
6. Wait until the chamber temperature is reached, then wait for equilibrium (stability observation time factor set as desired).



Weigh the net tara of the empty unit



Put the SAL-T standard into the measurement chamber



Place the probe inside the basket over the SAL-T into the measurement chamber

Example

of doing a Sorption Isotherm curve (adsorption) with a **biscuit**:

- Selected temperature of Novasina instrument: 25.0°C.
- The totally desiccated sample has a net weight of 0.485g.
- SAL-T 11% was placed together with the sample in the chamber. After about one hour, the a_w value was 0.087. Weighing the sample showed 0.519g, which is a 6.94% increase in weight; this is the moisture content at this point!
- Next salt: SAL-T 33%. Displayed values: 0.290 a_w , 0.530g (+ 9.1%).
- Next salt: SAL-T 53%. Displayed values: 0.523 a_w , 0.553g (+13.84%).
- Next salt: SAL-T 75%. Displayed values: 0.749 a_w , 0.605g (+24.55%).

Greater humidity was not of interest in this „dry biscuit“ case. With these 5 points, a rough SI curve can be drawn.

6. Calibration

6.1. Factory Calibration, Delivery Status

Every new instrument, as well as **every new replacement sensor unit**, called **CM-2** cell, is delivered already factory calibrated at 7 points : 0.06, 0.11, 0.33, 0.53, 0.75, 0.90 and 0.97 a_w and a factory certificate. The user therefore only has to check accuracy and recalibrate, if required, after some time. We recommend checking the points that cover the products' a_w range, in the beginning after 2 weeks, then 4 weeks, then 3 months, as long as the values are within the tolerances specified by the user's QC manual, or fix shorter recalibration periods according to personal standards.

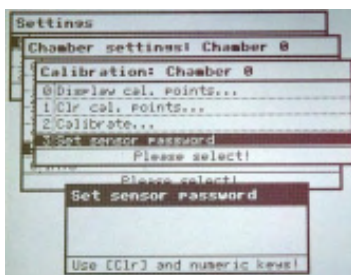
An other good way is, to test one point with a Novasina SAL-T standard that fit near to the last measurement point of the last few probes at the end of a day. Leave the SAL-T minimum 30 min into the chamber before you write the value in a table. If you have a bigger drift of the actual measurement accuracy is over a longer periode, calibrate the system new. You dont need to calibrate any point of the chamber at once if you measure always in a high a_w -value every time. Then it will be enough, when you check and calibrate only the 0.75, 0.90 and 0.97 a_w point.



A sensor unit carries all calibration information. Up to 15 points can be stored. Please check the sensor calibration data. Most likely a 4% point and all Novasina standard salts 0.34, 0.63, 0.11, 0.33, 0.53, 0.75, 0.90, 0.97, and 0.98 a_w are stored in the memory for automatic recalibration within 15°C and 30°C.

Note : Define a standard quality process for your work and define an standard test procedure for your **LabMASTER/PARTNER-aw** system.

6.2. Set Sensor Password



Every sensor unit can be used in any of the **LabMASTER/PARTNER-aw** instruments and carries all calibration data with it. We call it „**intelligent sensor**“ unit. Nevertheless, for highest accuracy, Novasina recommends checking/recalibrating an instrument once it is finally installed and has been switched on for several hours. A very good and easy check on some humidity points is possible using the Novasina SAL-T checks, which are included.

This sensor unit can now be **password-protected** so that only an administrator who knows the password has access to the first recalibration of the sensor. The password protects only the sensor and is stored on the sensor itself. This is set after the first full calibration in the facory (factory setting of the sensor password is "8808"). Please change it as a system administrator immediately when starting operating the device.

After that, recalibration is freely accessible (exception: after a reset to factory settings).



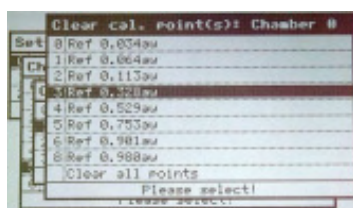
Attention : Store the password together with your system administrator password on a secure place. An forgotten password means to send the sensor back to Novasina. There is no way to reset the sensor!

Set a sensor password:

Go to menu "**Settings**" -> "**Chamber settings**" -> "**Select chamber**" number (only if you have 2 or more chambers activated), then press (5) "**Calibration**" ->n (3): now type a "**password**".

6.3. Display Sensor Calibration Points

Information about each calibration point can be seen in this menu. Each calibration point is stored directly on the intelligent sensor. Information like calibration date, time and user, who performed the are accessible.



Go to menu **"Settings"** -> **"Chamber settings"** -> **"Select chamber"** number (only if you have 2 or more chambers activated), then press **"0 : display calibration points"** choose a point. If it has been calibrated, details of the last calibration will be shown after selecting the point and pressing **"Select"**. The information will show up in a new window.

6.4. Calibration Procedure

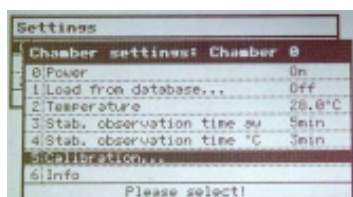
- Before calibrating, we recommend having the instrument **switched on** for **several hours**, e.g. over night, with chamber temperature set between 15 and 30°C (standard is 25°C), so the following morning the calibration can be started (*this time is necessary for the temperature stability and accuracy of the many electronic components inside the device*).
- If the SAL-T standards are at a greatly different temperature than the chamber, please place the next SAL-T standard in the pre-conditioning chamber. The calibration time will be shorter.
- Place a **SAL-T humidity standard** in the measurement chamber and put the next SAL-T standard inside the pre-conditioning chamber, then close it. Set the aw stability and temperature time factor to „5 minutes“ and **start the ANALYSING** or wait for at least **45 minutes**. It is important to reach an equilibrium in humidity as well as in temperature!
- A calibration is only possible within a certain temperature range. The sensor carries all humidity standard values in function of the temperature, so a calibration is always correct within the stored temperature range of a standard. **Usually 15 to 30°C** is a sufficient range. Extended ranges may be available for future sensor units on request.

Please place always at first time the SAL-T 0.75 a_w into the chamber. This special point called basic calibration. If you have one time trouble about the sensor, it can be possible to fix this if you clear all cal. point and start a new calibration with the SAL-T 0.75. After that go down to 0.53, then 0.35 and 0.11. Now you can go forward with the 0.90 and at last 0.97. Check the 0.75 point at the end of a full calibration.

Calibration, re-adjusting

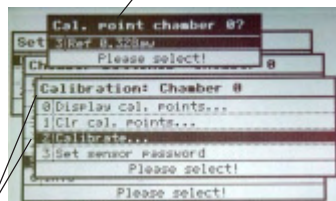
go to the menu **"Settings"** -> **"Chamber settings"** -> **"Select chamber"** number-> **"calibration"**, then (2) **"calibrate"**.

In case of **close together points** you will be asked to **select** the correct value that corresponds to the **SAL-T salt** in the chamber.

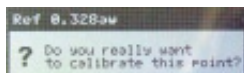


Menue calibration

Select table for



Menu calibration



If the actual value is **outside** of the **acceptable tolerance** of the sensor, a **warning** text appears. Most likely that **CM-2 sensor** must be **replaced**.

Calibration is possible: you may be asked (*only once for a new sensor*) to enter the sensor password.

The calibration itself is then done immediately and confirmed by „**Calibration was successful**“.

SAL-T 97% rh and the older SALT-T 98%rh: never try to calibrate both! They are too close together and would disturb the measurement.



Attention : If all calibration points have been cleared, you should start a new calibration with the base calibration using the **SAL-T 75%** standard first. After calibrating this first point, all other desired points can be calibrated in any order.

| Type of Hum.check | Novasina type | EU Toxic classe | Color of salt | Chem. symbols | % relative humidity in relation of temperature (x / 100 in a _w) | | | | Literature Reference |
|-------------------|---------------|-----------------|---------------|--|---|------|------|------|----------------------|
| | | | | | 15°C | 20°C | 25°C | 30°C | |
| SAL-T / 4 | SC-4 | T | white | CsF (>25%) | 4.3 | 3.8 | 3.4 | 3.0 | A |
| SAL-T / 6 | SC-6 | Xn | white | LiBr | 6.9 | 6.6 | 6.4 | 6.2 | A |
| SAL-T / 11 | SC-11 | Xn | white | LiCl | 11.3 | 11.3 | 11.3 | 11.3 | A |
| SAL-T / 33 | SC-33 | -- | blue | MgCl ₂ -6H ₂ O | 33.3 | 33.1 | 32.8 | 32.4 | A |
| SAL-T / 53 | SC-53 | O | green | Mg(NO ₃) ₂ -6H ₂ O | 55.9 | 54.4 | 52.9 | 51.4 | A |
| SAL-T / 75 | SC-75 | -- | purple | NaCl | 75.6 | 75.5 | 75.3 | 75.1 | A/B |
| SAL-T / 90 | SC-90 | T | white | Ba(Cl) ₂ -2H ₂ O | 90.9 | 90.5 | 90.1 | 89.9 | C |
| SAL-T / 97 | SC-97 | -- | yellow | K ₂ SO ₄ (>20%) | 97.9 | 97.6 | 97.3 | 97.0 | A |
| SAL-T / 98 | SC-98 | T+/N | orange | K ₂ Cr ₂ O ₇ | 98.5 | 98.2 | 98.0 | 98.0 | A |

Lit :

- A : Greenspan, Humidity Fixed points of Binary Saturated Aqueous Solutions
Journal of Research of the National Bureau of Standards Vol. 81A, No1 01/02 1977
B : Robinson R.A. and Stokes R.H. Electrolyte Solutions, Butterworths London 1959
C : Wexler, Humidity and Moisture Vol.3, Fundamentals and Standards, Robert E.Krieger,
Publishing Company Huntington, New York

6.5. Clear Sensor Calibration Points



This function clears all calibration points in one time and allows to make a full "basic" re-calibration of the sensor.

The only reason for clearing a point is a value, which is obviously wrong and no humidity standard available to correct it. Clear all values if their accuracy is doubtful and make a full new calibration with new standards, at least at 2 points, for better accuracy at minimum 6 or 7 points from 0.064 to 0.97 a_w .

Go to the menu **"Settings"** -> **"Chamber settings"** -> **"Select chamber"** number-> **"clear calibration points"** choose a point from the table to clear, or choose „clear all points“.

6.6. Interfaces RS-232 and USB



The Novasina **LabMASTER-aw** can be connected to a PC via the USB or the RS232 interface (9-pin D-sub plug). Please do not connect both interface to a PC at the same time. This will not work and maybe it can damage the system!

The software „Novalog MC“ (for Win9x/2000/NT/XP) is also delivered. It leads the communication and can be used to evaluate the measured data of several channels of the **LabMASTER-aw** system. Further the data's can be exported to Excel and saved on a PC. On the Novalog MC CD there is an installation program which has to be performed.

The data string from the instrument to a PC (only important for software engineers); applies for "data format" -"Novalog32"

The information comes over the line in a continuous data string from the **LabMASTER-aw** system to the Novasina DLL (software part inside your operating system) to the „Novalog32“ software. The data string can be as well used for other software implementations. For example for a connection to a production planning system (called PPS). Any string has a structure of 23 characters.

| Position | 12 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|-----------|----|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Parameter | T | T | T | T | T | | F | F | F | F | F | F | | D | D | D | D | D | D | D | C | L |
| Example | 2 | 5 | . | 0 | C | | 8 | 3 | . | 5% | | | | 6 | 1 | 9 | . | 3 | D | | | |

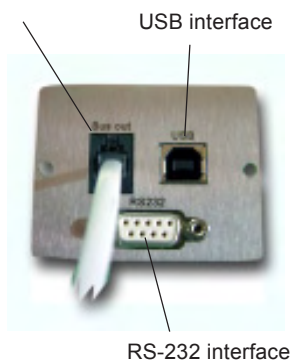
T: Temperature in °C

F: Relative humidity in %rh

D: Dx values for Novasina internal use only

C: Carriage return (CR)

L: Line feed (LF) xxxxxxxx



Instead of communication over a RS-232 interface, it can be made over the **USB interface** integrated in the **LabMASTER-aw**. A suitable **USB plug** is integrated on the back of the unit.

Please use ordinary USB cables that are available in computer stores. The USB interface uses the USB 1.1 standard.

As soon as you connect a **LabMASTER-aw** with a USB cable to a Windows PC, Windows will ask you to install two new drivers for the USB as well for a virtual RS-232 interface to the "NovaLog MC" software. You will find the drivers on the Novasina „**NovaLog MC**“ CD under directory "USB-Driver". After successful installation, the **NovaLog MC** program can be connected on a virtual **USB COM port** and then receive data from the USB interface. Please check, which virtual COM port no. is used in your Windows system after the driver installation. This is an important information for the NovaLog MC software and essential for a working data transmission.

It is not possible to operate both USB and RS-232 at the same time. USB always takes priority over the RS-232 interface.

7. Maintenance

7.1. Cleaning



Caution ! Before cleaning **switch OFF** the Novasina **LabMASTER-aw** and **dis-connect** it from the mains.

Use a damp cloth to clean the housing of the Novasina **LabMASTER-aw** or a **LabPARTNER-aw**. Use a commercially available mild cleaning agent, as required. Make sure no water is entering the housing or the connectors.

Caution! Do not use aggressive cleaning agents.



Caution ! Please do **NEVER** clean the sensor CM-2 itself. It is not possible to do that! The sensor is a very sensitive element with a chemical filter protection on the top. If you blow or touch the filter with a mechanical part or if you try to clean it with any liquid cleaning products, the sensor might be damaged!

7.2. Sensor Recalibration with Humidity Standards

Like all precision measuring instruments, the Novasina humidity sensor must be checked periodically. After initial commissioning of the instrument, we recommend carrying out a calibration

- every couple of months,
- always before measuring critical products, at minimum those points covering the product's aw range
- when the instrument was not used over a period of time.

Novasina developed a simple method for checking the sensors with humidity standards. The humidity standards are saturated aqueous salt solutions consisting of pure chemical salts and distilled water. If the humidity standard is in thermal and humidity equilibrium with the sensor, it can be seen, if the displayed value is within the user's tolerance band or outside. If the deviation is greater than desired, a recalibration is recommended.

The humidity standards should be saturated so that they form a slushy slurry. Before use we recommend to shake the humidity standard vigorously.

Note: Under normal storage and maintenance conditions the humidity standards will last for several years.

7.3. Replacing Protective Filters

The use of special pre-filters (available as accessories) is recommended as protection against faster sensor aging due to chemical aggression.

A destructive effect on a sensor may have e.g. alcohols, aromas, amines, acids (lactic, formic, sulphuric), hydrocarbons, halogens etc. Please consult the protection filter specifications.

General rule

Chemical pre-filters are to be used if the admissible workplace concentrations (MAK-values) are exceeded.

Some examples :

| | | |
|------------------|----|---------|
| sulphur dioxide | -> | 2 ppm |
| formaldehyde | -> | 2 ppm |
| hydrogen sulfide | -> | 3 ppm |
| ethanol | -> | 300 ppm |

Novasina offers the following protection filters for the **LabMASTER/ PARTNER-aw**.



- **Redox filter**
Chemical filter:
protects against all kinds of alcohols, aromas, fragrances.
- **eVC-21 chemical filter**
Chemical filter:
protects against hydrogen peroxide, acid gases, diluted acetic and -formic acid, sulfur dioxide, chlorine.
- **eVC-26 universal filter**
Chemical filter:
protects against a multitude of aggressive substances, e.g. nitrogen oxides, amines, aldehyde solvents, aromatic hydrocarbons, oil vapours, fine dust particles.
- **eVALC-1 alcohol filter**
Mechanical filter:
protects against alcohols.



Note: Certain aggressive vapours may also influence the measured result. Exactly for that reason, the use of an appropriate protection filter is highly recommended. A combination of 2 filters may also be used for overall protection (e.g. **eVC-21** and **eVALC-1**).

Filter replacement

Chemical filters must be periodically replaced. Saturated filters falsify the measuring results and the protective effect of chemical filters also deteriorates.

No generally valid guidelines can be given concerning the filter service life as this mainly depends on the **concentration** of harmful substances and the operating temperature.

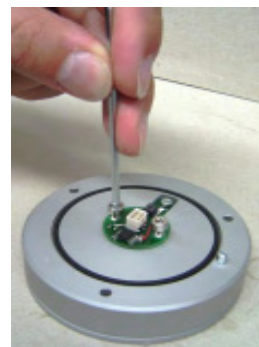
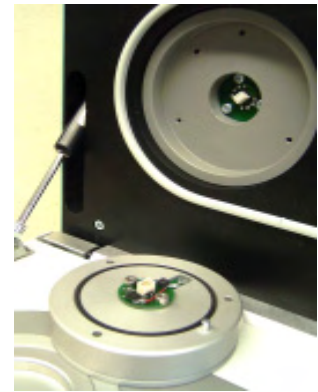
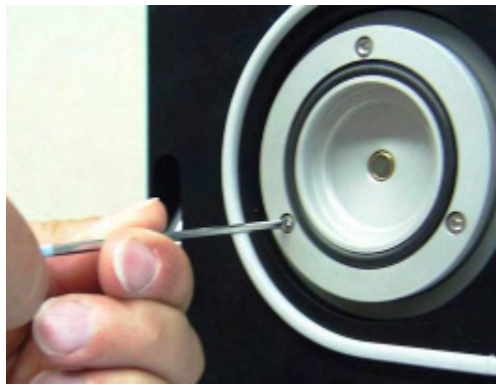


Attention! A damaged filter must be replaced immediately. Please replace as well any chemical filter periodically and calibrate the system **WITH** the filter on board. Do not handling at any time into the chamber without any glove!

All filter are fixed into the head of the measurement chamber with a snap ring. It will be possible to put maximum 2 filters in serial line direct behind the sensor and in front of the measurement chamber. Every filter protection helps to extend the lifetime of the sensor itself, but extends as well the measurement time.

7.4. Replacing a CM-2 Sensor Unit

- Switch off the instrument and disconnect the mains from the system.
- Remove the 3 screws (tool is inside the SAL-T set), carefully pull out the measuring block (NEVER let drop this unit on the instrument table).
- Remove the two sensor unit screws on the backside of the measuring block.
- Pull out the CM-2 unit.
- Push the new CM-unit in its position and assemble in the opposite manner.
- Set the measuring block back into the instrument cover in the right place (there is only one position possible to click in).
- Screw in the last 3 screws of the measuring block (don't fix the screws too tight).



Warning! Never press with a finger on the top of measuring cells, this might damage the cell protection filter!

7.5. Replacing an Instrument Fuse

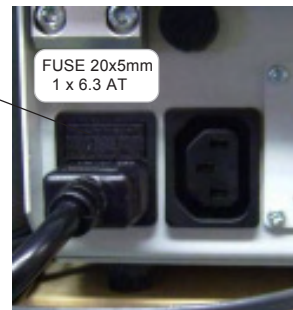
The **LabMASTER-aw** can be connected directly to your local power line of 90...260V AC. A main fuse protects the power supply against overload. The fuse is integrated directly inside the mains connector. Please follow the instructions to replace it with a same type of fuse (1 spare fuse included in drawer above mains connector).



- Switch off- the **LabMASTER/PARTNER-aw**.
- Pull out the mains cable to have access to the fuse drawer.
- Replace a defective fuse by one of the same type (1 spare fuse included)!

fuse holder
20 x 5mm
230V / 6.3 A
incl. 1 pc spare fuse

main cable
115/ 230 V AC



8. Technical specifications

General

| | | |
|----------------------|---|--|
| Mains supply | : | 90...260V, 50/60Hz |
| LabMASTER-aw | : | Fuse: 6.3 A FST (slow blow), 1 spare fuse |
| LabPARTNER-aw | : | Fuse: 6.3 A FST (slow blow), 1 spare fuse |
| Power consumption | : | max. 65 W per instrument (after temperature equilibrium 15 W) |

Permissible ambient

| | | |
|----------------------|---|--|
| Temperature range | : | 5...45°C |
| Humidity range | : | 5...95%rH not saturated ! |
| Surface area (W x D) | : | 26 x 44 cm (<i>LabMASTER and PARTNER-aw</i>) |
| Weight | : | 10 kg (<i>depends on the additional accessories</i>) |
| Protection class | : | IP 21 |

Temperature controller

| | | |
|--|---|--|
| Temperature setting range | : | 0...50 °C |
| Accuracy of control | : | > +/- 0.1°C |
| Max. cooling in respect of ambient temperature | : | 25 °C down to the ambient temperature! |
| Max. deviation | : | ±0.2 °C |

Measuring system with measuring converter and sensor

| | | |
|---------------------------------|---|--|
| Measuring range aw-value sensor | : | 0.03...1.00a _w |
| Operating range aw-value sensor | : | 0°C...50°C |
| Accuracy when fully calibrated | : | ±0.003 a _w (<i>at 25°C and 7 point calibration</i>) (<i>range 0.04...0.97a_w</i>) or +/- 0.010a _w |
| Resolution | : | 0.001 a _w |
| Repeatability | : | ±0.002 a _w |
| Temperature sensor accuracy | : | ±0.3 °C |
| Temperature sensor resolution | : | 0.1 °C |

Interface

| | | |
|-------------------------|---|--|
| USB / RS-232 | : | USB 1.1 RS232, Baud rate 9600, 19'200 ASCII signs |
| LCD illuminated display | : | 115mm x 86mm, 320 x 240 dot matrix LCD with LED backlight |
| LabMASTER-aw | : | |
| LCD illuminated display | : | 60mm x 17mm, 2 x 30 character orientated LCD with LED backlight |
| LabPARTNER-aw | : | |

Level of sound

| | | |
|---------------------------|---|----------|
| Noise level is lower than | : | < 68 dBA |
|---------------------------|---|----------|

More technical information and data see as well
operation manual of the *LabPartner-aw*

8.1. Equilibrium humidity values of the SAL-T humidity source



| Type of Hum.check | Novasina type | EU Toxic classe | Color of salt | Chem. symbols | % relative humidity in relation of temperature (x / 100 in a _w) | | | | Literature Reference |
|-------------------|---------------|-----------------|---------------|--|---|------|------|------|----------------------|
| | | | | | 15°C | 20°C | 25°C | 30°C | |
| SAL-T / 4 | SC-4 | T | white | CsF (>25%) | 4.3 | 3.8 | 3.4 | 3.0 | A |
| SAL-T / 11 | SC-11 | Xn | white | LiCl | 11.3 | 11.3 | 11.3 | 11.3 | A |
| SAL-T / 53 | SC-53 | O | green | Mg(NO ₃) ₂ ·6H ₂ O | 55.9 | 54.4 | 52.9 | 51.4 | A |
| SAL-T / 90 | SC-90 | T | white | Ba(Cl) ₂ ·2H ₂ O | 90.9 | 90.5 | 90.1 | 89.9 | C |
| SAL-T / 98 | SC-98 | T+/N | orange | K ₂ Cr ₂ O ₇ | 98.5 | 98.2 | 98.0 | 98.0 | A |

Lit : A : Greenspan, Humidity Fixed points of Binary Saturated Aqueous Solutions
Journal of Research of the National Bureau of Standards Vol. 81A, No1 01/02 1977
B : Robinson R.A. and Stokes R.H. Electrolyte Solutions, Butterworths London 1959
C : Wexler, Humidity and Moisture Vol.3, Fundamentals and Standards, Robert E.Krieger,

9. Troubleshooting

9.1. What is wrong, when....?

| | |
|---|---|
| A connected <i>LabPARTNER</i> -aw is not found by a <i>LabMASTER</i> ? | <ol style="list-style-type: none"> 1. Your <i>LabMaster</i> has not the "ADVANCED" functions activated. 2. The bus cable or the mains power is not connected correctly. 3. Another <i>LabPARTNER</i> in the system has the same chamber No. |
| No recalibration of the aw-value is possible? | <ol style="list-style-type: none"> 1. The user management system does not allow the calibration function. 2. The sensor is protected with an additional password. 3. Your sensor is damaged or badly contaminated. Change the sensor immediately. |
| You have a drift of the aw-value after completing the analysing process? | <ol style="list-style-type: none"> 1. The stability observation factor for aw or °C is too short in time. 2. The temperature of the probe is not in equilibrium (Chamber). 3. The probe has an second sorption step.(A fat barriers or something else) |
| Cooling power of the instrument is at the limit and the temperature of the chamber is not stable? | <ol style="list-style-type: none"> 1. The ambient environment temperature around the instrument is too high. 2. The probe produces a chemical heating (Process) 3. The internal cooling control does not work properly. |
| Reading of the LCD screen is very bad? | <ol style="list-style-type: none"> 1. The contrast of the screen is very low (contrast = 0). 2. The backlight is turned off or the background light is low. 3. The ambient light is bad. Please change the place of the instrument |
| You as a user, you have forgotten your password? | <ol style="list-style-type: none"> 1. Contact your system administrator, he can change your old password to a new one. 2. If you are a system administrator, you have to reset the system to the factory status or send the instrument to the next Novasina service station. 3. Reload the software via RS-232 or USB on the <i>LabMASTER</i> -> You loose all personal settings of the system! |

9.2. Error message screens

If any error message appears on the **LabMaster-aw** screen, please proceed as follows:

*** Please write down the error message carefully. Switch the instrument off and restart. If the error message recur, please follow the instructions on the table and/or contact your Novasina representative (www.novasina.com)**



Hardware-Errors

| error report | error description | needed action |
|--|--|--|
| "PELTIER Driver!" | cooling unit or electronics defective ! | * , return the instrument for repair |
| "Fan!" | ventilator, cabling or fan-electronics defective ! | * , return the instrument for repair |
| "Temp control (temp gauge)!" | Table-temperature-sensor, cabling or control-electronics defective ! | * , return the instrument for repair |
| "Temp gauge head!" | Table-temperature-sensor, cabling or control-electronics defective ! | * , return the instrument for repair |
| "No humidity sensor!" | Humidity measurement system not recognized. Sensor, cabling or -electronics defective ! | replace humidity sensor, return the instrument for repair |
| "Humidity sensor file system!" | Data system of humidity measurement system defective. Sensor, cabling or electronics defective ! | replace humidity sensor, send the instrument for repair |
| "Humidity Sensor capability!" | capability of humidity measurement system is wrong. (Sensor is incompatible to the instrument) ! | use a humidity measurement cell with the latest technology |
| "Capability Firmware!" | capability of measuring chamber (electronics) wrong ! | Update the firmware |
| "CRC F-Settings!" | EEPROM - content factory settings destroyed ! | * |
| "CRC U-Settings!" | EEPROM - content user settings destroyed ! | * |
| "Humidity Gauge (analog)!" | Humidity measurement system, cabling or electronics defective ! | * , use a new humidity measurement cell |
| "Humidity system!" | humidity measurement faulty ! | * |
| "BUS!" | BUS error ! Communication between LabMASTER and PARTNER faulty ! | * , Check the cabling of the LabPartner-aw |
| "File format not supported!" | Sensor incompatible (data - format) ! | * , Update the latest software, use a suitable humidity sensor |
| "Sensor not supported or defective!" | Sensor incompatible (test circuit) ! | * , use a suitable humidity sensor |
| "The battery of the data memory must be replaced!" | Battery empty, defective or no battery in the instrument ! | Please contact your Novasina representative |



Several errors

| error report | error description | needed action |
|---|--|--|
| <i>"The SRAM was re-initialized! All data were reset to default conditions, except for the calibration values!"</i> | The "battery" - packed RAM -content is destroyed and was new initialised. All settings have been cancelled except the saved calibration values ! | 1) press "OK" 2) enter the licence-code under "System settings" ...->"Set options code". The code is stated on the licence-certificate or on the sticker on the bottom of the instrument. This point does not apply for the LabMaster-aw "BASIC"-version. 3) set all settings new (date, time, "user" account, ...) |



Fatal Error

| error report | error description | needed action |
|----------------------|--|--|
| <i>"Fatal Error"</i> | fatal hardware- or (mainly) software-error | Please note the error message carefully, switch the instrument off and restart. If the error message recur, please contact your Novasina representative (www.novasina.com) |

LabMaster-aw menu settings

0 Chamber settings

0 Power

- 0 off
- 1 on

1 Load from database

- 0 to 9 data base
- _ Don't load from file (off)

2 Temperature

(0 to 50°C) / (32 to 132°F)

3 Stability parameter aw

(1 to 30 min)

4 Stability parameter temp

(1 to 30 min)

5 Calibration

- 0 Display calibration points
- 0 to 8 calibration points
- 1 Clear calibration points
- 2 Calibrate
- 3 Set sensor password

6 System info

- 0 System info chamber
- 1 System info sensor

Settings

- 0 Chamber settings...
 - 1 Sample database...
 - 2 System settings...
- Please select!

1 Sample database

0 to 9 Sample Database

0(e.g. Bread white)

- 0 Name
- 1 Time
- 2 Stab. Observation time aw
- 3 Stab. Observation time °C

2 System settings

0 Set date, time

- 0 Date
- 1 Time

1 Users 0 to 9 user accounts

- 0 Name
- 1 Password
- 2 Administrator
- 3 Permit Calibration
- 4 Permit edit sample database
- 5 Permit chamber settings

2 Units

- 0 Humidity (aw/%RH)
- 1 Temperature (°C/°F)
- 2 Data format (D/M/Y; Y/M/D; M/D/Y)

3 Buzzer

- 0 Volume (0 to 9)
- 1 Stable buzz duration (0 to 120 seconds)

4 LCD settings

- 0 Contrast (0 to 9)
- 1 Backlight (0 to 9)

5 Communication

- 0 Device
- PC 1 Data format(PC) ... NLOG x
- 0 to 9 Novalog 32 (Chamber x)

Printer 1 Printer configuration ...

- 0 Laboratory (name)
- 1 Auto stable printout (on/off)
- 2 Line feed, form feed (0 to 99)

6 Reset to factory settings

7 Info

8_Set option code

The Novasina team would like to thank you for your confidence and hope you will enjoy and obtain successful measurements with the world leader instrument LabMaster-aw for high performance quality measurement of water activity and its manifold options. You have now the powerfulllest water activity meter with outstanding options, simple handling and best reproducibility for your special application in quality measurements.

In case of any further questions, Novasina and its agencies will be happy to advise you at any time.

Your Novasina



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